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WATER POLLUTION SURVEILLANCE SYSTEM. VOLUME 3. SOUTHEAST BASIN

Public Health Service
Washington, D. C.

30 September 1963

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SOUTHEAST BASIN

volume 3

PUBLIC HEALTH SERVICE

Water Pollution Surveillance System

ANNUAL COMPILATION OF DATA

October 1, 1962 • September 30, 1963

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE • Public Health Service

SOUTHEAST BASIN

Volume 3

Public Health Service

Water Pollution Surveillance System

ANNUAL COMPILATION OF DATA
October 1, 1962 - - - September 30, 1963

A Federal, State and Local cooperative report on water pollution surveillance of surface waters at selected locations throughout the United States

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service, Division of Water Supply and Pollution Control
Washington, D.C. 20201

RELATED PUBLICATIONS:

National Water Quality Network
Annual Compilation of Data, October 1, 1957–September 30, 1958
Public Health Service Publication No. 663 (1958 Edition)

National Water Quality Network
Statistical Summary of Selected Data, October 1, 1957–September 30, 1958
Public Health Service Publication No. 663—Supplement 1

National Water Quality Network
Annual Compilation of Data, October 1, 1958–September 30, 1959
Public Health Service Publication No. 663 (1959 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1959–September 30, 1960
Public Health Service Publication No. 663 (1960 Edition)

National Water Quality Network
Plankton Population Dynamics, July 1, 1959–June 30, 1961
Public Health Service Publication No. 663—Supplement 2

National Water Quality Network
Annual Compilation of Data, October 1, 1960–September 30, 1961
Public Health Service Publication No. 663 (1961 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1961–September 30, 1962
Public Health Service Publication No. 663 (1962 Edition)

ACKNOWLEDGMENT

To increase the usefulness of the water quality data, annual compilations since 1958, including this one, have presented preliminary and unadjusted flow data for gaging stations at or near most of the Public Health Service Water Pollution Surveillance System sampling points. Final data may be obtained directly from the agency concerned. Any studies using the provisional flow data herein compiled should verify the data prior to completion of reports on such studies. For making the flow information available for this publication, grateful acknowledgment is made by the Public Health Service to:

The International Boundary and Water Commission,
United States and Mexico

The International Joint Commission, United States and Canada

The U.S. Department of the Interior
Bureau of Reclamation • Geological Survey

The U.S. Department of the Army
Corps of Engineers • Lake Survey

FOREWORD

This is the sixth annual compilation of data from the Public Health Service Water Pollution Surveillance System (formerly the National Water Quality Network). During this year, the System was increased from 122 to 128 stations. In order to provide data in a form more useful for local or regional water pollution control officials and their staffs, the present compilation is published in 11 separate volumes. The surveillance data reported herein reveal additional findings on pesticides and other organic chemicals in surface waters and on trends in radioactivity and other areas.

The Public Health Service gratefully acknowledges the assistance to our Surveillance System of the participating local, State and Federal Government agencies and private industry. The success of this program depends, in a large measure, upon their continued interest and support.

GORDON E. MCCALLUM, D. Sc.,
Assistant Surgeon General,
Chief, Division of Water Supply and Pollution Control

VOLUME 1

Northeast Basin

CONNECTICUT RIVER
at Enfield Dam, Conn.
below Northfield, Mass.
at Wilder, Vt.

HUDSON RIVER
below Poughkeepsie, N.Y.

LAKE ERIE
at Buffalo, N.Y.

MERRIMACK RIVER
above Lowell, Mass.

RARITAN RIVER
at Perth Amboy, N.J.

ST. LAWRENCE RIVER
at Massena, N.Y.

VOLUME 2

North Atlantic Basin

DELAWARE RIVER
at Philadelphia, Pa.
at Trenton, N.J.
at Martins Creek, Pa.

POTOMAC RIVER
at Washington, D.C.
at Great Falls, Md.
at Williamsport, Md.

SCHUYLKILL RIVER
at Philadelphia, Pa.

SHENANDOAH RIVER
at Berryville, Va.

SUSQUEHANNA RIVER
at Conowingo, Md.
at Sayre, Pa.

VOLUME 3

Southeast Basin

APALACHICOLA RIVER
at Chattahoochee, Fla.

CHATTAHOOCHEE RIVER
at Columbus, Ga.
at Lanett, Ala.
at Atlanta, Ga.

ESCAMBIA RIVER
at Century, Fla.

ROANOKE RIVER
at John H. Kerr Dam and
Reservoir, Va.

SAVANNAH RIVER
at Port Wentworth, Ga.
at North Augusta, S.C.

TOMBIGBEE RIVER
below Columbus, Miss.

VOLUME 4

Western Great Lakes and Lake Erie Basins

WESTERN GREAT LAKES

DETROIT RIVER
at Detroit, Mich.

LAKE MICHIGAN
at Gary, Ind.
at Milwaukee, Wis.

LAKE SUPERIOR
at Duluth, Minn.

ST. CLAIR RIVER
at Port Huron, Mich.

ST. MARYS RIVER
at Sault Ste. Marie, Mich.

LAKE ERIE BASIN

CUYAHOGA RIVER
at Cleveland, Ohio

MAUMEE RIVER
at Toledo, Ohio

VOLUME 5

Ohio and Tennessee River Basins

OHIO RIVER BASIN

ALLEGHENY RIVER
at Pittsburgh, Pa.

CUMBERLAND RIVER
at Clarksville, Tenn.

KANAWHA RIVER
at Winfield Dam, W. Va.

LITTLE MIAMI RIVER
at Cincinnati, Ohio

MONONGAHELA RIVER
at Pittsburgh, Pa.

OHIO RIVER
at Cairo, Ill.
at Evansville, Ind.
at Louisville, Ky.
at Cincinnati, Ohio
at Huntington, W. Va.
below Addison, Ohio
at Toronto, Ohio

WABASH RIVER
at New Harmony, Ind.

TENNESSEE RIVER BASIN

CLINCH RIVER
above Kingston, Tenn.
at Clinton, Tenn.

TENNESSEE RIVER
at Pickwick Landing, Tenn.
at Bridgeport, Ala.
at Chattanooga, Tenn.
at Lenoir City, Tenn.

VOLUME 6

Upper Mississippi River Basin

ILLINOIS RIVER
near Grafton, Ill.
at Peoria, Ill.

MISSISSIPPI RIVER
at Cape Girardeau, Mo.
at East St. Louis, Ill.
at Burlington, Iowa
at Dubuque, Iowa
at Lock and Dam 3 below St. Paul, Minn.

RAINY RIVER
at Baudette, Minn.
at International Falls, Minn.

RED RIVER (NORTH)
at Grand Forks, N. Dak.

VOLUME 7

Missouri River Basin

BIG HORN RIVER
at Hardin, Mont.

BIG SIOUX RIVER
below Sioux Falls, S. Dak.

KANSAS RIVER
at DeSoto, Kans.

MISSOURI RIVER
at St. Louis, Mo.
at Missouri City, Mo.
at Kansas City, Kans.
at St. Joseph, Mo.
at Omaha, Nebr.
at Yankton, S. Dak.
at Bismarck, N. Dak.
at Williston, N. Dak.

NORTH PLATTE RIVER
above Henry, Nebr.

PLATTE RIVER
above Plattsmouth, Nebr.

SOUTH PLATTE RIVER
at Julesburg, Colo.

YELLOWSTONE RIVER
near Sidney, Mont.

VOLUME 8

Southwest-Lower Mississippi River Basin

ARKANSAS RIVER
at Pendleton Ferry, Ark.
at Little Rock, Ark.
near Forth Smith, Ark.
near Ponca City, Okla.
at Coolidge, Kans.

MISSISSIPPI RIVER
at New Orleans, La.
at Delta, La.
at Vicksburg, Miss.
at West Memphis, Ark.

OUACHITA RIVER
at Bastrop, La.

RED RIVER (SOUTH)
at Alexandria, La.
at Bossier City, La.
at Index, Ark.
at Denison, Tex.

VERDIGRIS RIVER
at Nowata, Okla.

VOLUME 9

Colorado River and Western Gulf Basins

COLORADO RIVER BASIN

ANIMAS RIVER
at Cedar Hill, N. Mex.

COLORADO RIVER
at Yuma, Ariz.
above Parker Dam, Ariz.-Calif.
near Boulder City, Nev.
at Page, Ariz.
at Loma, Colo.

GREEN RIVER
at Dutch John, Utah

SAN JUAN RIVER
at Shiprock, New Mex.

WESTERN GULF BASIN

RIO GRANDE
at Brownsville, Tex.
at Laredo, Tex.
at El Paso, Tex.
below Alamosa, Colo.

SABINE RIVER
near Ruliff, Tex.

VOLUME 10

Pacific Northwest and Alaska Basins

PACIFIC NORTHWEST

CLEARWATER RIVER
at Lewiston, Idaho

COLUMBIA RIVER
at Clatskanie, Oreg.
at Bonneville, Oreg.
at McNary Dam, Oreg.
at Pasco, Wash.
at Wenatchee, Wash.
at Northport, Wash.

PEND OREILLE RIVER
at Albeni Falls Dam, Idaho

SNAKE RIVER
at Ice Harbor Dam, Wash.
at Wawawai, Wash.
at Payette, Idaho

SPOKANE RIVER
at Post Falls Dam, Idaho

WILLAMETTE RIVER
at Portland, Oreg.

YAKIMA RIVER
at Richland, Wash.

ALASKA BASIN

CHENA RIVER
at Fairbanks, Alaska

SHIP CREEK
at Anchorage, Alaska

VOLUME 11

California and the Great Basins

CALIFORNIA BASIN

KLAMATH RIVER
near Keno, Oreg.

SACRAMENTO RIVER
at Greens Landing above Courtland, Calif.

SAN JOAQUIN RIVER
near Vernalis, Calif.

GREAT BASIN

BEAR RIVER
above Preston, Idaho

TRUCKEE RIVER
at Calif.-Nev. Border
at Farad, Calif.

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ANALYTICAL AND FLOW DATA INDEX

STATION	General Description Trace Elements, Strontium 90	Radioactivity Determinations	Plankton Populations	Organic Chemicals	Chemical, Physical and Bacteriological Analyses	Flow Data
	Page No.	Page No.	Page No.	Page No.	Page No.	Page No.
Apalachicola River at Chattahoochee, Fla	25–26	27	28–29	30	31	32
Chattahoochee River						
at Columbus, Ga	33–34	35	36–37	38	39–40	41
at Lanett, Ala	43–44	45	46–47	48	49–50	51
at Atlanta, Ga	53–54	55	56–57	58	59	60
Escambia River at Century, Fla	61–62	63	64–65	66	67	68
Roanoke River at John H. Kerr Dam and Reservoir, Va	69–70	71	72–73	74	75–76	77
Savannah River						
at Port Wentworth, Ga	79–80	81	82–83	84	85–86	87
at North Augusta, S.C	89–90	91	92–93	94	95–96	97
Tombigbee River below Columbus, Miss	99–100	101	102–103	104	105	106

THE PUBLIC HEALTH SERVICE

Water Pollution Surveillance System

The Public Health Service program for providing fundamental information on the quality of the Nation's waters stems from Public Law 660, approved July 9, 1956, as amended by Public Law 87-88, July 20, 1961. Section 4(c) thereof states: ". . . the Secretary (of Health, Education, and Welfare) shall in cooperation with other Federal, State, and local agencies having related responsibilities, collect and disseminate basic data on chemical, physical, and biological water quality insofar as such data or other information relate to water pollution and the prevention and control thereof."

To fulfill this responsibility, the Public Health Service Water Pollution Surveillance System collects, interprets, and disseminates:

a. Information on changes in water quality at key points in river systems, as such quality may be affected by changes in water use and development.

b. Continuous information on the nature and extent of pollutants affecting water quality.

c. Data which will be useful in the development of comprehensive water resources programs.

d. Data which will assist State, interstate, and other agencies in their water pollution control programs, and in the selection of sites for legitimate water uses.

Some 50 sampling stations were established when the program started, October 1, 1957. By September 30, 1963, the number had grown to 128.

Each sampling location satisfies one or more of the following criteria:

a. Major waterways used for public water supply, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses.

b. Interstate, coastal, and international boundary waters.

c. Waters on which activities of the Federal Government may have an impact.

Sampling station sites are fixed only after consultation with local, State, Federal and other agencies having related interests.

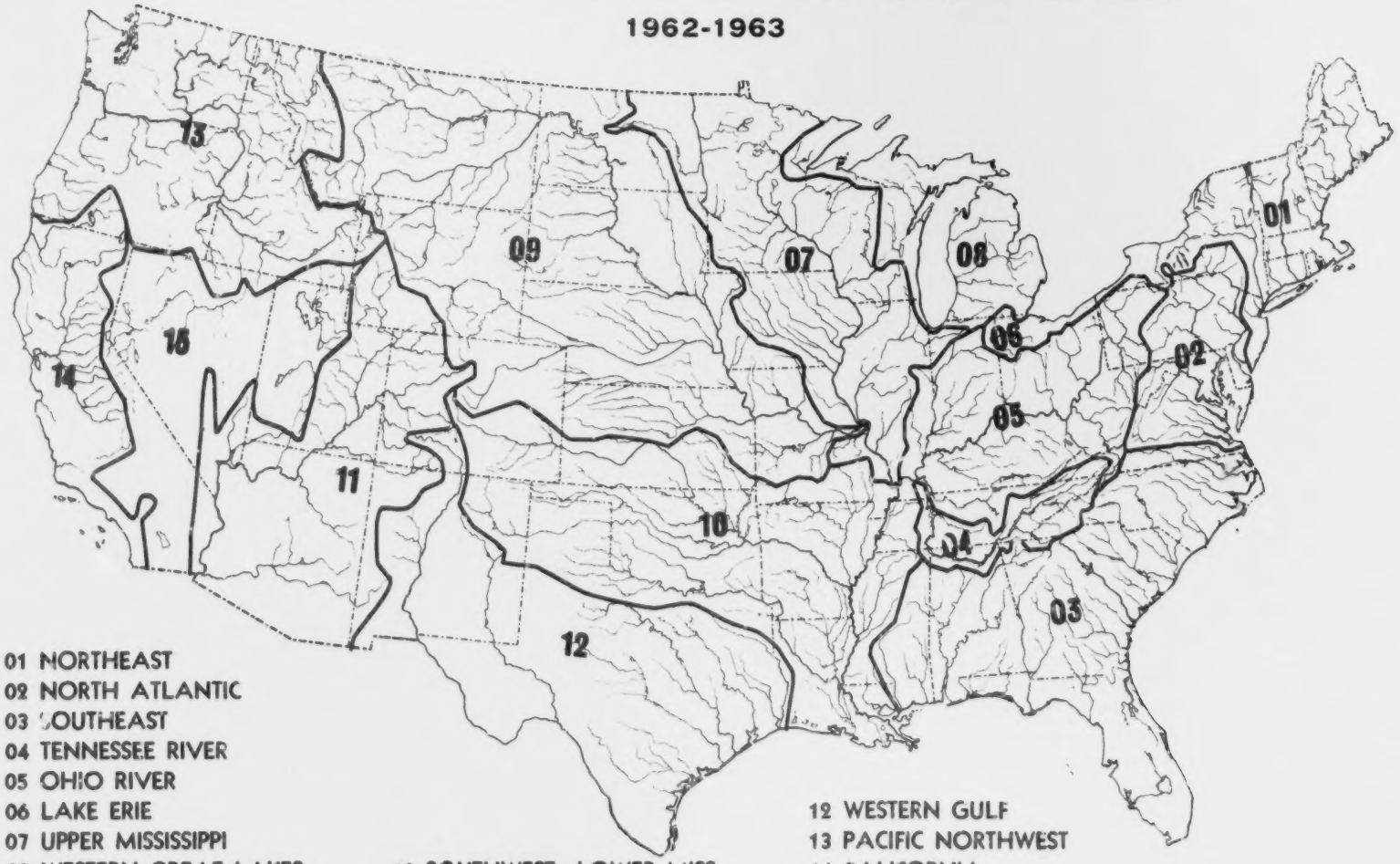
Active local participation is important in this operation. It assures maximum development of all information valuable both locally and nationally. Program costs are shared by the Federal Government and State and local agencies, those of the latter through contributions of laboratory and sampling manpower. Specifically, the State and local agencies perform certain of the conventional chemical analyses and collect samples for the newer, more complex examinations. The Public Health Service, in turn, performs the more complex determinations and makes the results available to the participants and to the public. In addition, the consultation, training facilities, and other resources of the Public Health Service are available to the cooperating agencies.

Locations of sampling stations in operation as of September 30, 1963, are shown on page 2. Descriptions of the stations, participating agencies, and other pertinent information are presented with the station data.

PHS Water Pollution Surveillance System

MAJOR RIVER BASINS OF THE UNITED STATES

1962-1963



01 NORTHEAST
02 NORTH ATLANTIC
03 SOUTHEAST
04 TENNESSEE RIVER
05 OHIO RIVER
06 LAKE ERIE
07 UPPER MISSISSIPPI
08 WESTERN GREAT LAKES
09 MISSOURI RIVER
10 SOUTHWEST—LOWER MISS.
11 COLORADO RIVER
12 WESTERN GULF
13 PACIFIC NORTHWEST
14 CALIFORNIA
15 GREAT BASIN

Only after careful screening of needs in water resource development was a pattern set for analyses of water samples.
All System samples are examined for:

a. Radioactivity.
   (1) Gross alpha.
   (2) Gross beta.
   (3) Strontium 90.
b. Plankton populations.
c. Coliform organisms.
d. Organic chemicals.
e. Biochemical, chemical, and physical measurements, including biochemical oxygen demand (BOD), dissolved oxygen (DO), chemical oxygen demand (COD), chlorine demand, ammonia nitrogen, hydrogen ion concentration (pH), color turbidity, temperature, alkalinity, hardness, chloride, sulfate, phosphates and total dissolved solids.
f. Sodium, potassium, fluoride and trace elements.

Samples for groups c and e were collected and analyzed weekly. Samples for organic chemicals were collected and analyzed monthly and plankton organism examinations were conducted semimonthly. Water samples for analysis of suspended and dissolved gross alpha and beta radioactivity were submitted weekly. Strontium 90 analyses were made on composites of weekly samples accumulated over 3-month periods. Sodium, potassium, fluoride, and trace metals were also determined on 3-month composites of weekly samples. New parameters which are developed and found significant will be included as the program continues.

Analytical Methods and Reliability of Data

The physical, chemical and biochemical data documented in this publication are the result of efforts of the cooperating agencies. In general, about half of these measurements were contributed by their laboratories. Specifically, all measurements reported for temperature, pH, DO, BOD, COD, chlorine demand and ammonia nitrogen were performed by the participants at the sample collection point. In addition, about 45 of the participating groups regularly perform all or most of the determinations for the remaining parameters included in the data. Whenever possible, analyses for stable constituents not completed by the participants are completed in the central Water Quality laboratories. While individual laboratories make minor modifications to meet local conditions, the methods used in most cases are those published in the 11th edition, "Standard Methods for the Examination of Water and Wastewater" (*22*). For uniformity, the chlorine demand test is reported on the basis of the starch-iodide titration procedure, and the chemical oxygen demand test is restricted to the use of 0.025 N reagents.

To assure continued reliability in the published data, frequent analysis of reference samples are made by each cooperating laboratory as an integral part of the overall program. Periodically a synthetic standard sample is provided to each participant for reference analysis. The reported results are reviewed. Any significant errors are called to the attention of the reporting laboratory and, after the cause of the errors has been determined, the previously submitted data are either corrected or discarded. From these findings, the analyses reported in this compilation are believed to be accurate to ±10 percent of the reported values.

The analytical methods used by the Public Health Service laboratories are described in the discussion of water quality parameters which follows, and are covered by references listed in the Bibliography.

Water Pollution Parameters

In the assessment of water pollution, all of the legitimate purposes for which raw waters can be used, and which may be affected by pollution, must be considered. These may range from the minimum requirements for navigation to the ultimate in water quality demanded for certain industrial processing. Standards differ considerably, therefore, according to water use.

For domestic use, water must be free of disease organisms, clear, colorless, taste- and odor-free, and have a relatively low dissolved mineral content. Agricultural water is judged primarily on its mineral content, especially with respect to the ratio of sodium to other cations, and the presence of boron. Water for fish propogation and recreational purposes must be relatively free from domestic and industrial pollution and must be able to sustain an active flora of the smaller aquatic organisms on which fish and wildlife feed. Industrial water quality demands run the gamut from the complete absence of minerals to a requirement of low temperature, the critical factor in water used for cooling. The effects of radioactive materials on these uses have not yet been fully appraised.

The various laboratory examinations made as part of this program are discussed below.

Radioactivity

Radioactivity, long recognized as a water contaminant from natural sources, has continued to grow in importance and health significance with the development of nuclear energy for both military and peaceful uses. Consequently, levels must be measured continually as new sources are established.

Gross alpha and beta measurements are made on both suspended and dissolved solids in the raw surface water samples. The total radioactivity in the dissolved solids provides a rough measure of the levels which may be found in a treated water, where water treatment removes substantially all of the suspended matter.

Beta activity levels generally reflect the variable contamination resulting from fallout and discharges from nuclear energy installations, institutions utilizing radioactive materials, and other manmade sources. The trend of gross beta radioactivity in samples received from 47 of the Public Health Service Water Pollution Surveillance System stations operating since 1957 is presented in Figure 1. During the first three quarters of the 1962 water year, renewed weapons testing resulted in a rise in gross beta radioactivity in surface waters of the United States. During the sec-

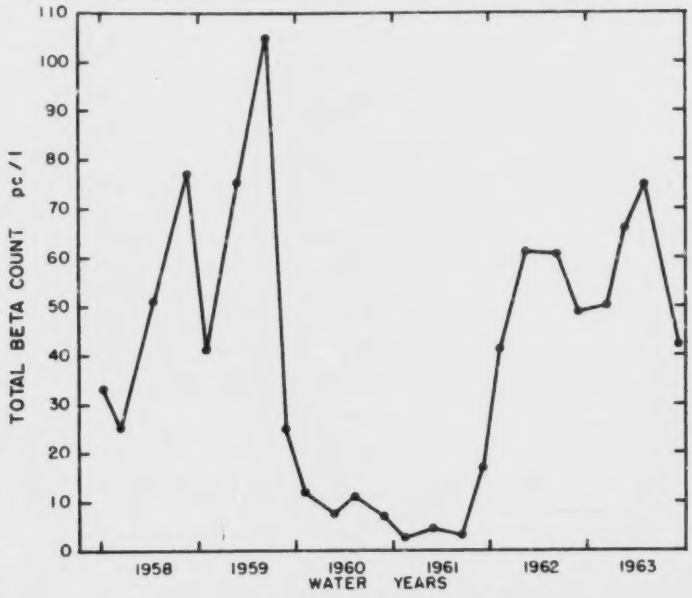


FIGURE 1. GROSS BETA RADIOACTIVITY IN THE SURFACE WATERS OF THE UNITED STATES.

ond and third quarter of water year 1963, the national average activity reached a maximum of 75 pico curies per liter and then decreased. Beta levels have remained well below the Public Health Service Drinking Water Standard of 1,000 pc/l or $\mu\mu c/l$ (26).

Alpha levels reflect largely the activity added by uranium and thorium daughters. The waters of the United States can be characterized in a general way with respect to gross alpha radioactivity content. Gross alpha levels average less than 1 pc/l in east coast, Appalachian, Great Lakes, and Pacific Northwest States. On the Colorado Plateau, and along the eastern slope of the Rocky Mountains, natural radioactivity, principally from mineral deposits, results in average concentrations of about 20 pc/l.

Gross levels are most informative in ascertaining long-term trends or changes in water quality. By themselves, however, they are of limited value in assessing radiation exposure. Where gross results are consistently over the maximum permissible concentrations for mixed fission products, the identity of the specific radionuclides involved must be established.

Because of its significance in the environment, the concentration of strontium 90 in the total solids is also reported. In water year 1963, strontium 90 levels ranged from 0.4 to 11.3 pc/l. The national average reached a high of 3.8 pc/l during the fourth quarter (July, August, September 1963). Highest levels were in the north-central area of the coterminous United States where the average was approximately 6 pc/l for this quarter. All averages were less than the limit (10 pc/l) specified in the Public Health Service Drinking Water Standards (26). The levels of strontium 90 activity in waters of the United States since the first quarter of the 1959 calendar year are presented graphically in figure 2.

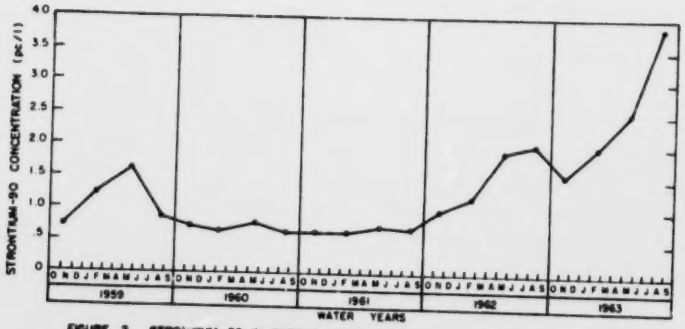


FIGURE 2. STRONTIUM-90 IN SURFACE WATER OF THE UNITED STATES.

Plankton Populations

Geographical distribution of algae and other planktonic organisms are influenced by geologic and climatic factors, and result in distinctive plankton populations in different areas. Within each region, population changes are directly related to temperature, and the nature and concentration of organic and mineral substances which enter the aquatic environment. These substances may come from domestic sewage, industrial wastes, runoff from agricultural lands, irrigation discharges, or native rocks and soils. They may be basic nutrients, highly toxic, or metabolically inert. Planktonic organisms differ greatly in their sensitivity to the nutrient and toxic substances which are present. Some thrive only in water which is relatively free of nutrients while others multiply rapidly in water which has been greatly enriched. Large numbers of tolerant algae usually develop in waters containing abundant supplies of inorganic nitrogen and phosphorus resulting from the mineralization of domestic sewage. These nuisance populations may clog filters in municipal water plants, and produce objectional tastes and odors.

On the other hand, plankton populations may be eradicated by the introduction of toxic organic or mineral wastes. This is not desirable because some plankton organisms play essential roles in providing food and oxygen for higher forms of aquatic life, and in cleansing polluted waters.

Beginning at low nutrient levels, progressive enrichment of waters results in an increase in the variety and abundance of the plankton. However, as higher levels of enrichment are attained, the increase in total numbers of organisms is accompanied by a decrease in the number of kinds of organisms. This change is typical in populations which have been subjected to the wide spectrum of substances being introduced into

surface water in ever increasing amounts. Plankton counts, which provide information concerning the variety and abundance of organisms, are useful in detecting changes in the concentration of organic and mineral substances which enter water supplies.

METHODS OF ANALYSIS

Plankton samples are collected semimonthly at each station. A sample consists of 3 liters of raw water taken directly from the stream or from a treatment plant intake. Preservation is effected at the time of collection by the use of 30 ppm merthiolate.

Three types of analyses are performed:

1. Rotifers, crustacea, and other micro invertebrates are removed from a 1-liter aliquot of the sample by settling 24 hours. The sediment is placed in a special slide, 80 x 50 x 2 mm., and the organisms are enumerated under a compound microscope at 100× magnification. The counts are reported as organisms per liter.

2. A "total live algae" count is obtained from 1 milliliter of the sample by scanning two 50-mm. strips on a Sedgwick-Rafter slide using 200× magnification and a Whipple micrometer disc. An appropriate correction factor is used to convert the counts to units per milliliter. Each single cell or natural aggregate of cells (colony) occupying up to 300 square microns (μ^2) is counted as 1 unit. Large colonies are enumerated according to a modified areal-unit method in which aggregates occupying 300–1,000μ^2 are counted as 2 units, those occupying 1,000–2,500μ^2 as 3 units, those 2500–5000μ^2 as 4 units, and those over 5,000μ^2 as 5 units. About 95 percent of cell aggregates fall into size 1 or 2.

3. Identification and proportional census of diatom species are done from sediment obtained by settling 1 liter of the sample 48 hours. A small aliquot of the sediment is placed on a No. 1 coverglass and dried on a warming table. The sediment is ashed on the coverglass by heating on a hotplate, and permanent slides are made with hyrax mounting medium. Counts are made with 90× apochromatic oil immersion objectives and 10× oculars containing a Whipple micrometer disc. Random strip counts are made until the total number of units reaches 200 to 300. The same areal units are used as described for Sedgwick-Rafter counting.

Organic Chemicals

The Nation's water resources continue to receive increasing quantities of organic contaminants. Since 1940 the chemical industry, particularly in the manufacture of synthetic and petrochemicals, has experienced an enormous expansion that shows every sign of continuing. Each year millions of pounds of synthetic detergents, insecticides, herbicides, and similar domestic products find their way into our streams from household sewers, industrial waste discharges, and land runoff.

Effective and economical treatment methods for most of the complex organic materials remain to be developed. Even where treatment exists, residues may remain in sufficient quantity to cause water damage. These stable residues persist through sewage treatment, biological and chemical action of the stream, and water treatment processes, and finally reach the consumer in drinking water.

The presence of some of these materials, even at concentrations considerably less than 1 part per million, may impair water quality, most noticably in production of tastes and odors. Fishflesh tainting, also quickly noticed by the consumer, is another damage. Effects on water treatment, many of which are ill-defined at present, and impairment of water quality for industrial uses are being reported with increasing frequency. Essentially nothing is known of the possible immediate or long-term effects of these materials on human health. Such information is urgently needed.

The usual sanitary analyses are not effective in measuring these newer organic contaminants. Yet it is essential to know something of their concentrations and character. A method known as the "Carbon Adsorption Technique," developed by the Public Health Service, permits the concentration of these organic compounds from a large volume of water. Elution of the adsorbed materials with organic solvents, followed by chemical separation and testing, provides useful information concerning organic pollution and for assaying river systems for these substances.

Following continuous flow of about 5,000 gallons of water through the carbon adsorption column over a 7- to 10-day period at 0.5 gpm, material on the carbon adsorption column is extracted with two solvents, chloroform and alcohol. The residues are weighed. The concentration of these materials in the water sampled is then computed. See Explanation of Analytical Data, page 21.

CHLOROFORM EXTRACTS

The organic residue recovered from the carbon adsorption column by chloroform is very complex. It is desirable to separate the crude extract into certain broad chemical classes, and this can be done on the basis of solubility differences. The various classes or groups and their general significance are discussed briefly below.

Ether Insolubles

This group is usually a brown, humuslike powder, apparently composed to a large extent of carboxylic acids, ketones, and alcohols of complicated structure. Origin of the group, which is an indicator of "old" pollution, is believed to be partially oxidized sewage and industrial wastes. For example, the Ohio River at Cincinnati has been exposed to much industrial and sewage pollution, and hence large amounts of ether insoluble materials are found. Streams with little or no pollution history have little or no ether insolubles. Chloroform extracts contain from 0 to 30 percent of ether insoluble material.

Water Solubles

These substances are largely acidic and undistillable at moderate temperatures, but their solubility in ether indicates that the molecules are smaller and probably simpler than the ether-solubles. On the other hand, their water solubility practically requires the presence of several functional groups, such as hydroxy-acid, keto-acid, and keto-alcohol. Such compounds probably originate from partial oxidation of hydrocarbons or they may be natural substances. They have very little odor. These materials usually make up 10 to 20 percent of the total extract.

Weak Acids

This group is characterized by being removed from ether solution with sodium hydroxide but not with sodium bicarbonate. Phenols are the best known weak acids, and if present in the water, appear in this group. Other weakly acidic compounds include certain enols, imides, sulfonamides, and some sulfur compounds. This group of materials also occurs in nature. The weak acids are odorous, and commonly constitute 5 to 20 percent of the chloroform extract.

Strong Acids

These acids are usually carboxylic acids such as acetic, benzoic, salicylic or butyric. Although classified as strong in reference to carbonic acid, they are actually weak when compared with a mineral acid, such as sulfuric. Many of the compounds are used industrially, but may also be produced by natural processes, such as fermentation. Some of the materials are highly odorous. This fraction makes up from 5 to 20 percent of the total. The significance of the strong acids can be interpreted only in the light of stream pollution conditions.

Bases

These compounds are organic amines. Such materials as aniline and pyridine are amines of commerce. Lower amines may occur as a result of decomposition. Although odorous, the low concentrations found are not likely to cause objectionable conditions. However, in the case of specific amine-containing wastes the compounds can be of considerable significance. Generally, only 1 or 2 percent of the total extract is made up of the bases.

Neutrals

This group frequently constitutes the major portion of the chloroform extract. Neither basic nor acidic, the materials are less reactive and tend to persist in streams longer than many other types. Hydrocarbons, aldehydes, ketones, esters, and ethers are examples of neutral materials. The group lends itself to further fractionation by means of chromatographic separation into aliphatic, aromatic, and oxygenated subgroups:

Aliphatics: This portion represents petroleum type hydrocarbons in a considerable state of purity, and is usually made up of mineral oil type of material. The percentage of aliphatics present yields important information about the possible source of pollution, since petroleum is the most likely source.

Aromatics: These are principally the coal tar hydrocarbons such as benzene, toluene, and a host of others, and their presence in any significant amount is a reliable indication of industrial pollution. Further, the materials can frequently be identified by infrared spectrophotometry. Some aromatic compounds which have been found in our rivers—and in our drinking water—include DDT, aldrin, endrin, dieldrin, phyenyl ether, orthonitrochlorobenzene, pyridine, phenol, and others. The materials are highly odorous, and may also be toxic. Their appearance in any quantity as pollutants should receive careful evaluation.

Oxygenated compounds (Oxys): These are the neutral compounds containing oxygen, such as aldehydes, ketones, and esters. They may have originated by direct discharge or may represent oxidation products from both natural and industrial materials. They help to indicate the "age" of the pollution, since pollution exposed to oxidation forces for a long time would be expected to contain large amounts of oxys. The oxy materials are odorous.

Losses

Manipulative losses inherent in this type of separation may amount to 10 to 15 percent. Losses greater than this may indicate that volatile components were lost from the sample. Such volatiles may have significance as pollutants.

ALCOHOL EXTRACTS

The alcohol extractables generally consist of materials more polar than the chloroform extractables. They often contain synthetic detergents, carboxylic acids and humic materials which may originate naturally or from oxidized products of domestic and industrial wastes. These classes of substances are not quantitatively recovered by the alcohol extraction. For example, this extraction recovers only 20 to 30 percent of the synthetic detergents present. On waters of mixed industrial and domestic pollution, the chloroform and alcohol extractables may be about equal. On some streams where the industrial pollution is rather low and much natural pollution or sewage is present, the alcohol extractables may exceed the chloroform extractables by a factor of 4 to 6.

The alcohol extract is usually only partially soluble in water and most ordinary solvents. Very little further chemical separation of this material is currently practical. However, tests have revealed that synthetic detergents may make up 1 to 12 percent of the alcohol extract.

OTHER TESTS

Infrared spectra are routinely run on the total chloroform and alcohol extracts as well as the neutral, aliphatic, aromatic and oxygenated groups which are usually the most significant. Spectra of other groups are obtained when there is an indication that they may be significant. These spectra reveal something of the chemical structure of the materials, indicate differences and in certain instances provide a definite identification. In the case of the alcohol extracts, the infrared spectra will indicate the presence of synthetic detergents if the materials constitute a significant portion.

Thin layer chromatography has been applied successfully to the resolution of the aromatic and basic fractions of CCE. Gas chromatographic equipment with flame ionization, electron-capture and microcoulometric detectors have also been used freely in the identification of specific substances.

COMPOSITE ANALYSIS

Samples from certain locations have been selected for analysis on a quarterly composite basis. Stations that have collected at least 12 samples in a nearly consecutive manner and averaged 100 ppb. or less of chloroform extractables are selected for such analysis when certain other conditions are met. However, samples falling in this category are analyzed individually when the recovery of the chloroform extract is exceptionally high and/or it is unusual in its infrared spectrum or some other physical characteristic.

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SPECIFIC IDENTIFICATIONS

Information about specific organic substances which were identified in carbon adsorption samples is given on the second page of the group associated with each station. The increased number of pesticide and other specific compounds identified, as compared to previous years, is partly associated with greater sensitivity in analytical methodology and may be partly a reflection of the increasing usage of these substances in the total environment.

Chemical, Physical, and Bacteriological Examinations

The various biochemical, chemical, physical, and bacteriological examinations generally performed by the participating laboratories are discussed below.

AMMONIA NITROGEN AND CHLORINE DEMAND

The cost of water treatment for domestic use is affected by the consumption of chlorine, with ammonia nitrogen being responsible for a large portion of the chlorine demand. The greater this demand, the more expensive is the treatment. The ammonia may originate from unstabilized domestic pollution, from industrial waste discharges, from run-off containing fertilizers used in farming operations or from all three. The presence of measurable quantities of nitrogen compounds, not necessarily ammonia, is also an indication of the fertility of the stream toward both macro- and micro-biological forms.

COLOR

Color in domestic water supplies is undesirable. Its removal in the water treatment process, whether it be from natural or industrial sources, may require large doses of chemicals and be expensive.

DISSOLVED OXYGEN, BIOCHEMICAL AND CHEMICAL OXYGEN DEMANDS

Biochemical processes, in which aquatic organisms attack and stabilize the organic matter present, require dissolved oxygen. If unstable oxidizable organic matter is present in excess, the organisms will multiply rapidly, consuming the oxygen present in the water, and bring about a foul, septic stream condition. The dissolved oxygen level thus serves to indicate the biochemical activity of the stream. High activity, resulting in low dissolved oxygen levels, will drive out game fish in favor of scavengers. Very low or zero oxygen levels will kill all fish and aquatic organisms dependent on dissolved oxygen for life. Temperature and reaeration rates also affect dissolved oxygen levels.

The 5-day biochemical oxygen demand (BOD) indicates the degree of unstabilized organic pollution from either domestic or industrial sources, to which the stream is being subjected. A significant demand will affect the fish and macroorganism population, and waters carrying a high BOD seldom contain game fish. On the other hand, game fish will thrive in streams in which the oxygen demand has been stabilized, as this condition is usually favorable for the growth of organisms on which fish feed.

The chemical oxygen demand analysis serves to support the findings of the biochemical oxygen demand test. It too may indicate to what extent the waste load of the stream has been stabilized, or it may indicate the presence of organic and inorganic pollution which is not readily oxidized by biological processes. Because the chemical oxygen demand can be determined quickly in comparison to the biochemical oxygen demand, the establishment of a correlation between the two parameters serves to reduce the number of the latter determinations required. The chemical demand results are nearly always higher than the biochemical demand.

TEMPERATURE

Temperature is particularly important to conservation and industry. A few degrees elevation in temperature due to cooling water discharges may seriously limit the capacity of a stream to support fish life. Also, high water temperatures increase the cost of cooling water for

industrial operations. Cooling towers and other equipment for handling cooling water must be engineered to the temperature levels normally encountered.

MINERAL CONSTITUENTS

These determinations include alkalinity, hydrogen-ion concentrations (pH), hardness, chlorides, sulfates, and total dissolved solids. The pH indicates whether water is acidic or alkaline, corrosive or passive. Alkalinity is a measure of the neutralization reserve present, or the extent to which the water can resist a change from an alkaline to an acid condition upon addition of acidic chemicals. This information is important to the water treatment plant operator and to many other water users.

Hardness is not only a measure of the soap consuming property, but is also of importance in the treatment of boiler waters, where removal of hardness is one of the most important functions. Chloride, sulfate, and total dissolved solids add further information on the gross dissolved mineral content carried by the stream. These are of great importance when considering the taste or palatability of water. They are also important when the water is being demineralized for specific industrial processes, since the cost of demineralization is a direct function of the dissolved solids content of the water. In addition, waters of high saline content are less desirable and may at times even be unfit for municipal, irrigation, and other uses.

TURBIDITY

Turbidity of water is due to the suspension of clay, silt, finely divided organic matter, microscopic organisms, and other similar materials. Its presence is of particular importance in water treatment processes and in the propagation of fish and other aquatic life.

COLIFORM ORGANISMS

Information about fecal pollution is essential to water quality measurements. Data on coliform bacteria, used as indicators of pollution, help to point up the trends in the effectiveness of treatment of domestic waste discharges.

The delayed-incubation membrane filter technique is used for the coliform examination, instead of the fermentation tube (MPN) method. The latter necessitates transport of water samples to the Water Quality Section laboratory for examination, with a time lapse between collection and examination that can significantly change their microbial content. Also, some of the many other bacteria present in raw water might overgrow or otherwise inhibit the demonstration of the coliform organisms. In the delayed-incubation membrane filter procedure, the bacteria are filtered out from the fluid samples immediately after collection and the filters sent to the Water Quality Section laboratory on a preservative medium. In the laboratory the membrane filters carrying the bacteria are transferred to a medium selective for coliform organisms, then incubated and counted. The resulting counts approach very closely the actual numbers of coliform bacteria present in the water samples at the time of collection.

Unusual populations of coliform bacteria may mean increased pollution and ensuing loss of water quality. The Public Health Service Water Pollution Surveillance System studies and reports the trends in sewage pollution on streams as indicated by the trends of coliform counts.

Trace Elements and Other Determinations

This year's trace element data differ somewhat from data reported in previous compilations in that the manner of obtaining the data has been modified and the program of elements measured altered. The trace metals measurements are now obtained from a 3.4 meter direct reading spectrograph. Tin, antimony, and bismuth have been discontinued; arsenic, boron, phosphorus, aluminum, and strontium have been added. Increased sensitivity for several elements has been attained, especially zinc, manganese, and beryllium, resulting in fewer indeterminate values.

Twice during the year, 3-month composites of the weekly samples were prepared and subjected to analysis. Examinations covered those elements included in the Public Health Service Drinking Water Standards (*26*), and other metals considered to have possible physiological or

toxicological significance. The ultimate goal of this phase of the program is to provide background data on all elements which may be found in water and which may be of significance in water quality management.

In carrying out the spectrographic examination, the sample is first passed through a membrane filter, .045 micron pore size, to remove all suspended matter. An aliquot of sample is then acidified with redistilled nitric acid and evaporated to a concentration containing 100 mg. of dissolved solids in 5.0 ml. A portion of the prepared sample is placed in a porcelain boat and sparked using a rotating disc, with concentrations of the 19 programed elements measured on the direct reader (*12*).

Waters of low dissolved solids content can be concentrated to a greater degree than those having a high dissolved solids content, thus accounting for the variable sensitivity shown in the tabulations. Values followed by an asterisk (*) show the limits of sensitivity at which the test was performed and indicate that the ion being measured was not detected at that level.

It is known that trace concentrations of some ions are subject to precipitation and adsorption on container surfaces during storage. This applies particularly to iron and manganese which are subject to oxidation. Hence, all the values reported by the spectrographic method represent the quantity of metal in solution at the time of analysis to within about 10 percent.

The measurement of sodium and potassium is performed using a flame procedure. Fluoride is determined with the SPADNS reagent using the method described by Bellack and Schouboe (*3*). Boron, previously measured by the curcumin procedure, is now reported from the spectrograph. Measurement of selenium has been eliminated due to the general absence of this element from the samples examined.

The concentrations of surface active agents, reported as alkyl benzene sulfonate (ABS), in the Nation's surface waters is reported for the first time on a number of selected stations. As the capability of determining this pollutant increases, efforts will be made to include all sampling points in the Surveillance System. The data presented here were obtained using a modification of the Standard Methods methylene blue procedure on an automatic analyzer.

The Benthos

Animals and plants that live in or on the bottom substrata of lakes and streams are known as the benthos. This biological community includes such common animals as immature insects, worms, clams, snails, and crustacea. The benthic populations found on a stream bottom are largely determined by the type of substrate. Bottoms consisting of soft silty sediments are normally inhabited by animals that are able to burrow into the sediments and feed on organic detritus in the sediments. These include worms, clams, and certain insect larvae. The number of species is usually small in these habitats. Shallow streams with shoals, rapids, and riffles have more available niches for animals to occupy and the normal benthic fauna usually includes a large variety of organisms.

The benthic populations provide a basic indicator of general water quality. Whereas the plankton organisms move downstream with the current, and fish are able to migrate considerable distances, the benthos is a population relatively fixed on the bottom and the animals are subject to the water flowing over them. The benthic populations will therefore be influenced by the quality of the water.

The animals that make up the benthos have various life cycles. Insects may exist as aquatic larvae living in the bottom for as long as 2 years. They then emerge as adults and mate. The female deposits fertilized eggs into the stream. Some of the class produce young which attach themselves to fish. Some of the worms reproduce asexually. An analysis of the age structure of certain forms in the benthos may provide information on past conditions of the water.

Under conditions of good water quality the benthos should include a variety of species with no one species being present in excessive numbers. If the water should become degraded, certain species in the population, intolerant of the changed environment, will die out; and as the water quality deteriorates, increased numbers of species in the benthos will be eliminated. The one or more species that survive may be able to develop very large populations. Toxic materials in the water or deposited on the bottom may effectively eliminate all bottom life.

At each station where bottom samples are taken an attempt is made to find areas of suitable substrate. From these areas, where pos-

sible, a series of at least six quantitative samples is taken by means of suitable dredges or samplers. In riffles the Surber squarefoot sampler is used. In deep rivers the Ekman or Peterson dredge is used (see Standard Methods, for the Examination of Water and Wastewater, 11th edition, pp. 572–582) (22). A general qualitative collection of invertebrate life is usually made at all stations.

The bottom materials are screened in the field using a screen with 28 meshes to the inch. The concentrated sample is preserved in alcohol and returned to the laboratory.

In the laboratory the sample is transferred to pans and the macroscopic organisms are separated from the sediment and detritus. The animals are then identified as near to species as possible, enumerated, and weighed. Specimens are preserved and retained for future reference.

During this year benthos data were gathered for stations in the Ohio and Tennessee River basins only and are presented with the descriptive material for the appropriate stations. A supplemental analysis of these data will be published separately.

Fish Populations

Fish are a biological end product of the aquatic environment. They are an important source of food, and sport fishing is one of our leading forms of recreation. The maintenance of fish life has been recognized by the Congress, and by States which have protective pollution control legislation, as an important and legitimate use of our Nation's waterways. In other words, in measuring fish populations at Surveillance System stations, we are not measuring a parameter that affects a water use as in the case of other measurements presented in this compilation, but rather a unique parameter that is in itself considered a beneficial water use.

The water quality requirements and tolerance of aquatic life to different types of contaminants vary tremendously. It is this variability in response which makes living aquatic organisms usable indicators of environmental disturbance. Fish require water relatively high in dissolved oxygen, and are intolerant of many chemical and physical contaminants resulting from agricultural, industrial and mining practices. However, the tolerance of different species varies, and man-induced changes of the environment often affect one species more than another, producing imbalanced populations which quite often favor the species less desirable economically.

Moderate amounts of putrescible wastes may enrich the habitat, resulting in great increases in standing crops of fish present. However, under such conditions, the more tolerant and adaptable species may comprise a disproportionate share of the total population, and very sensitive species may be eliminated altogether. The effect of toxic wastes may vary from complete elimination of populations to a reduction in reproductive capacity, growth and resistance to disease and parasitism.

Fish kills are a spectacular and obvious indication that an abrupt change has taken place in the environment. However, because of high mobility resulting in rapid recruitment, the fish population in a river or stream may return to normal levels within a very short time after a kill.

Chronic pollution, to which the fish population must adjust over a period of time, will be reflected in the kinds and relative abundance of the fish species present. In addition to the species composition, the condition of the fish, their growth, reproductive success and certainly their palatability are factors of considerable importance in evaluating the suitability of a body of water for supporting usable stocks of fish.

During the current water year, data on fish populations were gathered for some stations in the Ohio and Tennessee River basins only, and are presented in tables in volume 5 for the appropriate stations.

Fish samples at these stations were collected primarily with rotenone and with an electrofishing device. Five percent emulsified rotenone was applied at suitable sites, where an area of 1 to 3 acres could be blocked off with nets during the rotenoning operation. Such sites were usually in the form of small coves along the shoreline, the mouths of small tributaries, or behind the partial enclosure created by navigational lock walls. An electrical shocking device was used along the shoreline both during the day and at night. In a few cases, samples were also collected with trammel nets and with short, 25-foot haul seines. Sampling with nets and seines was limited because of the paucity of habitat in large rivers which is suitable for using these types of gear.

With each method used sufficient sampling was done to collect as many species present as possible, and to obtain a measure of the relative abundance and size distribution of the various species. Every type of fishing gear is somewhat selective, and the data obtained may not be representative of the actual population composition present in the river at the time of sampling. However, the data obtained by a given method are quantitatively comparable and may be used to evaluate changes in the population composition resulting from natural and man-induced changes in the habitat. Comparisons should be based on samples collected with the same gear, during the same season of the year, and under similar conditions of stream flow and water temperature. These data will be particularly useful in determining the impact of changes in water quality on the fish populations of the Nation's rivers over long periods of time.

For convenience of comparison, the fish in the tables are grouped into six major categories based on food habits and methods of feeding:

I. Large, sight feeding carnivores that feed on other fish. This group includes most game species.

II. Species that feed primarily on insects. This group provides important forage for species in group I.

III. Species that feed primarily on plankton and algae. These also provide important forage for group I species.

IV. Species that feed primarily on mollusks.

V. Omnivores that feed indiscriminately on plant and animal matter from the bottom.

VI. Scavengers that take any available food. Some of the species in this group may sometimes act as predators. The group also includes many important food fish, and species that are tolerant of degraded conditions.

Because foods and feeding habits vary with size, age, and availability of food, there may be considerable overlap between groups. The species listed were grouped according to available literature regarding the main foods of adult specimens of each species.

In the field the total length of the fish was routinely measured to the nearest inch class on a one-half inch interval. Thus a fish in the 5-inch class would measure from 4.5 inches to slightly under 5.5 inches. If the end of the tail touched the dividing line between two length classes, the fish was included in the higher classification. The percent total number and weight are carried to the nearest one-tenth of 1 percent in the tables. The one-tenth of 1 percent was arbitrarily selected for purposes of tabulation, and does not imply such a high level of sampling accuracy.

The fish are listed by common names in the tables according to American Fisheries Society Special Publication No. 2 (1960), A List of the Common and Scientific Names of Fishes From the United States and Canada, Second edition (*1*).

Stream Flow

Stream flow data have a most important role in the utilization of water quality parameters such as are included in this report. For this reason, average daily flow records are reported for most of the sampling stations in the System.

All flow data included in this compilation are *provisional* data furnished by the agencies credited, and are subject to revision by such agencies prior to any final publication. With the exceptions mentioned, the flows are given as furnished to the Public Health Service.

The data were generally furnished in units of cubic feet per second. In general only the first three digits were considered significant. Because of machine limitations the data are reported here in thousand cubic feet per second. Even though three zeros may appear after the decimal, no artificial accuracy of measurement is implied. Only the first three digits should be considered significant. There are two exceptions:

(1) When the flow was over 1 million cubic feet per second, the first four digits are reported, and (2) at times when the Rio Grande flows were extremely low, the data were reported to tenths of a cubic foot per second. These figures are published showing 4 decimal places.

Flow data for sampling stations on the rivers of the Great Lakes system are reported as the monthly mean flow, as computed by the U.S. Lake Survey. In certain other rivers, flow data were computed by the Public Health Service from information supplied by the gaging agency. The methods of computations are shown as footnotes to the data for the applicable stations.

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Explanation of Analytical Data

RADIOACTIVITY DETERMINATIONS

In evaluating radioactivity data it should be noted that the reported errors represent counting errors only and the reported values are subject to other errors commonly associated with gross radioactivity analysis. (See Reference 22.)

A dash (—) in the count column signifies that no determination was made. An asterisk (*) following date of sample indicates that determinations are for composites of two or more samples taken on and before the date shown.

Strontium 90 determinations are reported in micro-microcuries per liter as measured from total solids in the sample composited for the quarter. A dash (—) indicates that no determination was made in that period.

PLANKTON POPULATION

Plankton data are reported on two pages. The first page lists the population size of various groups of algae. A coded number shows the ten most abundant genera of algae and their count level. Code numbers used are identified on page 18. Blank spaces on the data sheets signify that counts of other genera were below a level of 150 per ml. The second page of plankton data lists the four dominant diatom species and their occurrence as a percent of the total diatom population. The percent of occurrence of all other diatom species is shown in the next column. Identification codes of species are given on page 19.

The detectable numbers per ml. of fungi, sheathed bacteria and protozoa are shown in the next two columns. The rotifer and crustacea totals per liter are listed together with the genera where these occurred at a count level of five or more per liter for rotifers and three or more per liter for crustacea. Nematode and miscellaneous animal form counts per liter appear in the last two columns.

A dash (—) indicates that no analysis was made. A zero count of each group is indicated by "0". Blank spaces under abundance and dominance columns indicate that the populations were too few to be included or were absent. Coding for abundant genera of rotifer and crustacea population levels are presented on page 20.

PLANKTON POPULATION

Identification Codes of Algae Genera and Count Levels of Most Abundant Genera

KEY TO COUNT LEVEL (per ml.)

1 150 to 300
2 301 to 600
3 601 to 1,200
4 1,201 to 2,400
5 2,401 to 4,800
6 4,801 to 9,600
7 9,601 to 19,200
8 19,201 to 38,400
9 38,401 and over

Code to ALGAE GENERA (Producers)

Blue-green Algae

01 Agmenellum (Merismopedia)
02 Anacystis (Microcystis)
03 Anacystis
04 Coccochloris
05 Gomphosphaeria
06, 07, 08 Reserve
09 Other genus
10 Other genus

Filamentous blue-greens

11 Anabaena
12 Aphanizomenon
13 Arthrospira
14 Lyngbya
15 Oscillatoria
16 Phormidium
17 Raphidiopsis
18 Spirulina
19, 20, 21 Reserve
22 Other genus
23 Other genus

Coccoid green algae

24 Actinastrum
25 Ankistrodesmus
26 Chlorella-type
27 Chlorococcum
28 Closterium
29 Coelastrum
30 Crucigenia
31 Dictyosphaerium
32 Golenkinia
33 Lagerheimia
34 Micractinium
35 Oocystis
36 Palmellococcus
37 Pediastrum
38 Scenedesmus
39 Staurastrum
40 Tetradesmus
41 Tetrastrum
42, 43 Reserve
44 Other genus
45 Other genus

Filamentous green algae

46 Cladophora
47 Stichococcus
48 Stigeoclonium
49 Reserve
50 Other genus

Green flagellates

51 Chlamydomonas including Carteria
52 Euglena
53 Lepocinclis
54 Pandorina
55 Phacotus
56 Phacus
57 Trachelomonas
58 Reserve
59 Other genus

Other pigmented flagellates

60 Chromulina
61 Dinobryon
62 Gymnodinium
63 Peridinium
64 Reserve
65 Other genus

Diatoms (with chromatophores)

Centric

66 Biddulphia
67 Coscinodiscus
68 Cyclotella
69 Melosira
70 Rhizosolenia
71 Stephanodiscus
72 Other genus

Pennate

73 Achnanthes
74 Amphiprora
75 Amphora
76 Anomoeoneis
77 Asterionella
78 Caloneis
79 Cocconeis
80 Cymatopleura
81 Cymbella
82 Diatoma
83 Diploneis
84 Fragilaria
85 Gomphonema
86 Gyrosigma
87 Navicula
88 Nitzschia
89 Pleurosigma
90 Rhoicosphenia
91 Surirella
92 Synedra
93 Tabellaria
94, 95, 96 Reserve
97 Other genus
98 Other genus
99 Other genus

PLANKTON POPULATION

Identification Code for Diatom Species

No.	Species	No.	Species	No.	Species
01	Achnanthes lanceolata	35	Diatoma elongatum	69	Nitzschia denticula
02	Achnanthes minutissima	36	Diatoma vulgare	70	Nitzschia (Lancelolatae group)
03	Achnanthes sp.	37	Diatoma sp.	71	Nitzschia sp. (first)
04	Amphiprora paludosa	38	Diploneis smithii	72	Nitzschia sp. (second)
05	Amphiprora sp.	39	Diploneis sp.	73	Opephora martyi
06	Amphora ovalis	40	Epithemia turgida	74	Pinnularia sp.
07	Amphora sp.	41	Epithemia sorex	75	Pleurosigma delicatulum
08	Anomoeoncis exilis	42	Epithemia sp.	76	Rhoicosphenia curvata
09	Asterionella formosa	43	Eunotia sp. (first)	77	Rhizosolenia eriensis
10	Bacillaria paradoxa	44	Eunotia sp. (second)	78	Rhopalodia gibba
11	Biddulphia laevis	45	Fragilaria capucina	79	Rhopalodia sp.
12	Caloneis amphisbaena	46	Fragilaria construens	80	Stephanodiscus astraea var. minutula
13	Caloneis sp.	47	Fragilaria crotonensis	81	Stephanodiscus dubius
14	Ceratoneis arcus	48	Fragilaria pinnata	82	Stephanodiscus hantzschii
15	Cocconeis pediculus	49	Fragilaria sp.	83	Stephanodiscus niagarae
16	Cocconeis placentula	50	Frustulia sp.	84	Stephanodiscus sp.
17	Cocconeis sp.	51	Gomphonema olivaceum	85	Surirella brightwelli
18	Coscinodiscus rothii	52	Gomphonema sp.	86	Surirella ovata
19	Coscinodiscus (brackish)	53	Gyrosigma kutzingii	87	Surirella striatula
20	Coscinodiscus sp.	54	Gyrosigma sp.	88	Surirella sp.
21	Cymatopleura solea	55	Hantzchia amphioxys	89	Synedra acus
22	Cymatosira belgica	56	Melosira ambigua	90	Synedra pulchella
23	Cyclotella atomus	57	Melosira distans var. alpigena	91	Synedra nana
24	Cyclotella comta	58	Melosira granulata	92	Synedra ulna
25	Cyclotella kutzingiana	59	Melosira binderana	93	Synedra vaucheriae
26	Cyclotella meneghiniana	60	Melosira islandica	94	Synedra sp.
27	Cyclotella pseudostelligera	61	Melosira italica	95	Tabellaria fenestrata
28	Cyclotella stelligera	62	Melosira varians	96	Tabellaria flocculosa
29	Cyclotella striata	63	Meridion circulare	97	Any entity not found above (first)
30	Cyclotella sp.	64	Navicula cryptocephala	98	Any entity not found above (second)
31	Cymbella ventricosa	65	Navicula sp. (first)	99	Reserved for future entity
32	Cymbella tumida	66	Navicula sp. (second)	xx	Insignificant or population inadequate
33	Cymbella sp.	67	Nitzschia acicularis		
34	Denticula sp.	68	Nitzschia tryblionella		

PLANKTON POPULATION

Identification Codes of Microinvertebrate Genera and Count Levels of Most Abundant Genera

Genera of ROTIFERS
Key to counts per liter

1 5 to 10
2 11 to 20
3 21 to 40
4 41 to 80
5 81 to 160
6 161 to 320
7 321 to 640
8 641 to 1,680
9 1,681 and over

Genera of CRUSTACEA
Key to counts per liter

1 3 to 5
2 6 to 10
3 11 to 20
4 21 to 40
5 41 and over

Code to MICROINVERTEBRATES

Rotifers

01 Asplanchna
02 Brachionus (also Platyias)
03 Collotheca
04 Cephalodella
05 Chromogaster
06 Euchlanis
07 Filinia
08 Gastropus
09 Hexarthra (also Pedalia)
10 Kellicottia
11 Keratella
12 Lepadella
13 Monostyla (also Lecane)
14 Notholca
15 Philodina and similar contracted bdelloids
16 Ploesoma
17 Polyarthra
18 Pompholyx
19 Proales
20 Rotaria
21 Synchaeta
22 Trichocerca
23 to 45 Reserve
46 Other genus
47 Other genus
48 Other genus
49 Other genus

Cladocerans

50 Nauplii
51 Bosmina and related genera
52 Daphnia and related genera
53 Moina
54 Polyphemus
55 to 72 Reserve
73 Other genus
74 Other genus
75 Other genus

Copepods

76 Cyclops, Euclops, and Paracyclops
77 Diaptomus
78 to 97 Reserve
98 Other genus
99 Other genus

Blank—Insignificant or population inadequate

ORGANIC CHEMICALS

Although units of concentration may be assigned to the values reported herein (µg/l or parts per billion), it is essential that the user of these data consider additional associated information. Introspective examination of the data reported herein has indicated that comparison of concentration values obtained from samples of similar gallonage are more valid than samples of widely differing gallonage. In addition, recent experimental researches have shown that lower flow rates and lower sample volumes than those employed (5,000 gallons at 0.5 gpm) are substantially more efficient and should produce relatively higher concentration values with this method. The first in a series of changes designed to increase sampling efficiency is already underway at Water Pollution Surveillance System stations.

Concentration values reported for specific substances are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE. In light of an unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

Zeros when reported have been entered. A dash indicates that the respective results were not reported. An asterisk in the column showing end of sample date indicates that the determinations are for composited samples taken on and before the date shown. The extent of compositing can be determined by examining the gallons filtered, which is the sum of the applicable individual samples immediately above it.

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

The data entered in each column are as reported. Concentrations of alkalinity and hardness are reported in milligrams per liter as $CaCO_3$. A dash signifies that the particular test was not performed. Zeroes when meaningful have been entered. An asterisk preceding a number should be read as "less than" the number following it.

TRACE ELEMENTS AND OTHER DETERMINATIONS

For a discussion of the sensitivity limits of the determinations performed with spectrographic methods, see page 11.

BASIN 2

SOUTHEAST

The Southeast drainage basin includes approximately 283,000 square miles which drain toward the Atlantic Ocean south of the Potomac Basin or into the Gulf of Mexico east of the Mississippi River Delta. Headwaters and upper reaches of the major streams are in the Appalachians. Lower reaches are in the Coastal Plain. The climate is humid with average annual rainfall varying from 35 inches in the Virginia Appalachians to 80 inches in the northern Georgia and South Carolina mountains. Average annual temperatures vary from about 54° F. in southern Virginia to 68° or 69° F. along the Gulf Coast. There are nine Public Health Service Water Pollution Surveillance System stations located on six rivers.

Roanoke River: The Roanoke River begins on the eastern slope of the Appalachian Mountains in Virginia and empties into Batchelor's Bay, an arm of Albemarle Sound in North Carolina. This stream is impounded by Kerr Dam, Roanoke Rapids Dam and Gaston Dam which provide for flood control and hydroelectric power.

Savannah River: The headwaters of the Savannah are in the Blue Ridge Mountains of North Carolina. The river forms the boundary between Georgia and South Carolina. There are extensive reservoir developments in the headwaters. The Savannah River plant of the Atomic Energy Commission lies between the two Surveillance System stations. This stream discharges into the Atlantic Ocean near Savannah, Ga.

Chattahoochee-Apalachicola Rivers: The headwaters of the Chattahoochee River are in northern Georgia. The lower 140 miles of the Chattahoochee form the Georgia-Alabama boundary. The stream is navigable up to Columbus, Ga. River stages are regulated by a system of locks and dams.

The Chattahoochee River joins the Flint River in Lake Seminole behind Jim Woodruff Dam to form the Apalachicola River which flows south across Florida and into the Gulf of Mexico.

Escambia River: This stream begins in south central Alabama and flows southerly across Alabama and the Florida Panhandle before discharging into Pensacola Bay. Its drainage area lies between those of the Chattahoochee River to the east and the Alabama River to the west.

Preceding page blank

Tombigbee River: This river is a major tributary to the Mobile River. It begins in Mississippi and flows southeastward into Alabama. The Surveillance System station is located near the State line.

A summary of the plankton populations of these rivers follows.

The chemical and biological characteristics of the water at stations in this basin are remarkably uniform. The waters are typically soft, low in dissolved phosphates and other nutrients, and plankton poor. The phytoplankton counts are generally less than 1,000/milliliter.

The algae are dominated by the centric diatoms *Melosira ambigua* and *M. distans* var. *alpigena,* except in the upper Chattahoochee River and the Escambia River, where the pennate diatoms *Synedra ulna* and *Cymbella tumida,* respectively, are the most abundant forms.

Zooplankton populations are low except in the Apalachicola River where populations of rotifers *Keratella, Polyarthra, Philodina, Trichocerca* and *Synchaeta* reach 2,000/liter.

APALACHICOLA RIVER AT CHATTAHOOCHEE, FLORIDA

This station is located at the intake of the U.S. Corps of Engineers Jim Woodruff dam on the Georgia-Florida State line at river mile 108.

The main water uses of the river in this area are navigation, power and recreation.

736-494 O - 64 - 3

Station Location:	Apalachicola River at Chattahoochee, Florida
Major Basin:	Southeast
Minor Basin:	Apalachicola River
Station at:	30°42' Latitude 84°52' Longitude
Miles above mouth:	108
Activation Date:	December 1959
Sampled by:	U.S. Army Corps of Engineers Florida State Hospital at Chattahoochee, Fla.
Field Analysis by:	Florida State Hospital
Other Cooperating Agencies:	Florida State Board of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Chattahoochee, Florida
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	17,100 square miles
Period of record:	1928 to present
Average discharge in record period:	21,270 cfs.
Maximum discharge in record period:	293,000 cfs.
Minimum discharge in record period:	4,950 cfs.

Remarks: Flows regulated by reservoir operations at Lakes Seminole, Sidney Lanier and Harding.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-1-63	0.03
7-8-63	0.03
7-17-63	0.03
7-23-63	0.08
7-29-63	0.06
8-5-63	0.05
8-13-63	0.07
8-19-63	0.08
8-26-63	0.03
9-3-63	0.03
9-10-63	0.03
9-17-63	0.04
9-30-63	0.05

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.05	.15
	Na	5	3.1
	K	1.5	.9
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	36	22
	Cd	*1	*1
	As	*9	*10
	B	21	17
	P	*2	18
	Fe	41	10
	Mo	*1	*2
	Mn	*1	*1
	Al	—	9.8
	Be	*.02	*.02
	Cu	8	7
	Ag	*.2	.3
	Ni	*1	3
	Co	*2	*2
	Pb	4	12
	Cr	*1	3
	V	*1	*5
	Ba	19	13
	Sr	25	18

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.9	.2	April to June	—	—
January to March	—	—	July to September	2.9	.5

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
6/13 - 6/21/63	Dieldrin	0.024
6/13 - 6/21/63	DDT	0.011
7/2 - 7/10/63	Dieldrin	0.007
7/2 - 7/10/63	DDT	0.005

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE FLORIDA

MAJOR BASIN SOUTHEAST

MINOR BASIN APALACHICOLA RIVER

STATION LOCATION APALACHICOLA RIVER AT CHATTAHOOCHEE, FLORIDA 57

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA								GROSS ACTIVITY	
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA	BETA
MO.	DAY	YR	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g ±	pc/g ±
10	1	62	10	26	0	0	0	1	0	1	11	6	0	6	11	8				
10	8	62	11	7	-	-	-	-	-	-	0	5	2	5	2	7				
10	16	62	12	14	-	-	-	-	-	-	3	5	0	6	3	8				
10	26	62	11	20	-	-	-	-	-	-	3	5	9	5	12	7				
10	31	62	12	19	-	-	-	-	-	-	3	6	8	6	11	8				
11	27	62	12	21*	0	0	0	1	0	1	3	6	12	6	15	8				
12	27	62	1	30	1	1	0	1	1	1	8	13	32	12	40	18				
1	24	63	2	26*	0	1	0	1	0	1	13	7	14	7	27	10				
2	19	63	3	28*	1	1	0	1	1	1	37	6	21	5	58	8				
3	26	63	4	17*	0	0	0	0	0	0	21	6	15	6	37	8				
4	26	63	5	22*	0	0	0	1	0	1	15	6	19	6	34	8				
5	29	63	6	19*	1	1	0	1	1	1	50	7	24	6	74	9				
6	17	63	7	9	0	0	0	0	0	0	2	7	21	7	23	10				
6	24	63	7	24*	0	0	1	1	1	1	3	5	17	8	20	9				
7	29	63	8	19*	0	0	0	0	0	0	8	3	18	3	26	4				
8	26	63	9	25*	0	0	0	0	0	0	4	6	13	6	17	8				
9	30	63	10	29*	0	0	0	0	0	0	1	5	16	6	17	8				

PLANKTON POPULATION

STATE FLORIDA
MAJOR BASIN SOUTHEAST
MINOR BASIN APALACHICOLA RIVER
STATION LOCATION APALACHICOLA RIVER AT CHATTAHOOCHEE, FLORIDA 057

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) (Number per ml.)	ROTIFERS										CRUSTACEA								NEMATODES (Identifiable) (Number per liter)	OTHER AERIAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)							
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	57	50	56	18	27	13	82	4	15	-	-	468	15	5	17	5	22	5	18	4	21	3	3	50	1					0	1
10	16	62	57	44	23	18	82	11	58	5	22	20	0	708	17	6	22	5	18	4	16	4	11	4	2							15	0
11	5	62	27	47	57	21	28	7	56	7	18	0	0	1910	17	8	22	7	21	7	15	5	11	5	51	50	4	76	3			0	0
11	27	62	57	40	27	20	56	19	92	3	18	0	-	36	17	2	11	2							0							0	0
12	4	62	57	40	56	17	82	10	58	7	26	0	0	344	17	6	21	4	22	4	11	4	18	2	9	50	2					0	0
12	17	62	27	41	57	13	82	9	56	5	32	-	0	0											0							0	0
1	8	63	57	31	56	10	27	8	82	7	44	0	-	129	21	4	17	3	11	2					3	50	1					0	0
1	24	63	27	81	56	5	57	3	1	2	9	0	0	0											1							0	0
2	7	63	82	52	1	7	71	5	2	4	32	0	0	1											0							0	0
2	18	63										0	-	0											0							0	0
3	6	63	57	50	92	12	56	8	58	4	26	-	-	1											0							1	0
3	18	63	57	50	82	20	9	8	56	7	15	-	-	131	11	4	17	3	21	2	10	1			0							0	0
4	12	63	57	76	27	9	56	8	2	2	5	-	-	147	17	4	21	3	11	3	22	2			21	51	2	50	2	76	2	15	0
4	16	63	82	51	57	19	56	9	1	5	16	-	-	96	11	4	17	2	16	1	22	1	18	1	34	76	4	50	2	51	1	0	0
5	7	63	27	46	58	44	57	5	9	1	4	-	-	-											-							-	-
5	23	63	58	42	57	27	92	14	82	14	3	-	-	-											-							-	-
6	4	63	56	42	58	29	57	11	92	5	13	-	-	-											-							-	-
6	17	63	56	35	58	29	92	10	57	6	20	-	-	-											-							-	-
8	5	63										-	-	-											-							-	-
8	19	63										-	-	-											-							-	-
9	3	63										-	-	-											-							-	-
9	16	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE FLORIDA

MAJOR BASIN SOUTHEAST

MINOR BASIN APALACHICOLA RIVER

STATION LOCATION AT APALACHICOLA RIVER AT CHATTAHOOCHEE, FLORIDA 57

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILA-MENT-OUS	COCCOID	FILA-MENT-OUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	2400	520	0	540	0	290	20	660	370	330	80	3	2	69	2	38	2	68	2	51	1										
10	16	62	3100	150	0	730	0	270	0	520	1410	250	80	73	2	38	2	92	2	51	1	69	1	88	1	87	1						
11	5	62	100	0	0	30	0	50	0	0	0	30	0																				
11	27	62	5300	330	0	460	0	150	250	3110	1040	460	120	69	4	68	3	3	1	25	1	60	1	92	1								
12	4	62	600	0	0	0	0	200	0	320	70	110	50	69	1	68	1	52	1	71	1												
12	17	62	600	0	0	20	0	80	0	360	110	90	110	69	1	68	1																
1	8	63	600	0	0	20	0	220	40	260	40	200	90	51	1																		
1	24	63	300	0	0	20	0	70	20	180	40	70	40	68	1																		
2	7	63	100	0	0	0	0	0	0	20	80	80	30																				
2	18	63	200	0	0	40	0	0	120	20	40	90	90																				
3	6	63	800	0	0	20	0	40	320	170	210	150	110	63	1																		
3	18	63	500	0	0	40	0	70	20	130	200	40	20																				
4	12	63	1700	0	40	40	0	150	290	1030	130	110	0	69	3	60	1																
4	16	63	2300	0	0	20	0	130	0	1870	260	90	110	69	4																		
5	7	63	2100	0	40	530	0	110	20	1230	150	290	70	68	3	69	2	34	1														
5	23	63	1300	0	0	180	0	90	20	860	150	310	150	69	3																		
6	4	63	1900	0	110	800	0	210	130	610	60	270	60	68	2	69	1	38	1	26	1												
6	17	63	3600	40	80	590	0	170	80	1200	1430	650	690	92	3	68	2	69	2	71	1	73	1										
8	5	63	900	220	0	420	0	120	30	100	50	200	200																				
8	19	63	1300	0	0	510	0	130	20	350	240	240	40	25	1	38	1																
9	3	63	1600	40	20	890	0	220	0	300	130	320	70	38	2	25	1																
9	16	63	1500	0	0	790	0	270	50	230	140	20	50	38	2	51	1																

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE: FLORIDA
MAJOR BASIN: SOUTHEAST
MINOR BASIN: APALACHICOLA RIVER
STATION LOCATION: APALACHICOLA RIVER AT CHATTAHOOCHEE, FLORIDA

57

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	CHLOROFORM EXTRACTABLES NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	22	62	11	29	4460	193	87	106	2	22	24	1	2	21	0	11	10	2	16
12	26	62	1	13	4270	199	66	133	7	20	14	1	1	11	1	6	5	1	13
2	19	63	2	28	6250	153	70	83	-	-	-	-	-	-	-	-	-	-	-
3	13	63	4	3	7477	98	48	50	2	13	12	1	1	9	1	6	3	1	11
4	26	63	5	23	7378	157	93	64	5	25	21	1	1	17	2	10	11	1	20
5	13	63	6	21	5370	161	81	80	6	23	17	0	1	15	1	9	9	2	15
7	2	62	7	10	5300	204	118	86	11	33	22	1	1	20	0	12	14	1	25
7	23	63	7	31	5050	153	68	85	-	-	-	-	-	-	-	-	-	-	-
8	15	63	8	22	5260	166	87	79	2	28	17	0	1	15	1	9	12	2	17
9	3	63	9	11	5470	162	84	78	-	-	-	-	-	-	-	-	-	-	-
9	27	63	10	7	4940	161	69	92	5	21	16	1	1	14	0	7	8	1	11

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE FLORIDA

MAJOR BASIN SOUTHEAST

MINOR BASIN APALACHICOLA RIVER

STATION LOCATION APALACHICOLA RIVER AT CHATTAHOOCHEE, FLORIDA 57

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	25.0	7.0	7.2	-	-	-	-	-	4	48	46	100	20	-	-	90	*130
10	8	62	30.0	6.5	7.4	-	-	-	-	-	6	44	42	95	20	-	-	85	-
10	15	62	25.0	7.0	7.4	-	-	-	-	-	5	48	46	100	20	-	.0	80	-
10	22	62	28.0	7.4	7.2	-	-	-	-	-	6	46	44	120	20	-	-	85	100
10	29	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000
11	5	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
11	15	62	13.0	7.6	7.4	-	-	-	-	-	4	48	44	90	20	-	-	80	-
11	22	62	15.0	6.5	7.6	-	-	-	-	-	6	46	40	120	20	-	-	100	-
11	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
12	10	62	13.0	6.4	7.2	-	-	-	-	-	4	42	44	125	-	-	-	-	100
12	17	62	15.0	7.4	7.6	-	-	-	-	-	4	32	36	120	40	-	-	-	100
12	31	62	12.0	7.0	7.4	-	-	-	-	-	5	38	42	100	50	-	-	-	*130
1	7	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*100
1	14	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
1	20	63	12.0	8.0	6.8	-	-	-	-	-	4	40	44	100	20	-	-	-	-
1	21	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
1	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
2	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
2	18	63	12.0	8.5	7.4	-	-	-	-	-	4	42	38	100	20	-	-	-	100
3	4	63	15.0	8.2	7.2	-	-	-	-	-	6	44	40	120	20	-	-	-	*130
3	11	63	15.0	8.5	7.2	-	-	-	-	-	4	46	48	150	25	-	-	-	*130
3	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
3	25	63	18.0	8.0	7.6	-	-	-	-	-	2	44	44	100	25	-	-	-	*130
4	1	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
4	8	63	20.0	7.6	7.2	-	-	-	-	-	4	42	38	80	20	-	-	-	*130
4	22	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
4	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
5	6	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
6	3	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*130
6	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*5
7	1	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
7	9	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
7	15	63	28.0	8.0	7.6	-	-	-	-	-	6	42	38	80	25	-	-	-	*5
7	29	63	25.0	7.6	7.2	-	-	-	-	-	4	44	40	90	25	-	-	-	-
8	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30
8	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
9	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	190
9	30	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Chattahoochee, Florida
Operated by U.S. Geological Survey

STATE Florida

MAJOR BASIN Southeast

MINOR BASIN Apalachicola River

STATION LOCATION Apalachicola River at Chattahoochee, Florida

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	8.620	7.020	21.200	14.200	20.900	20.900	32.700	21.700	22.900	27.600	20.200	9.460
2	9.380	9.320	19.100	14.900	20.600	23.600	32.500	29.100	22.500	24.200	19.800	9.060
3	10.400	8.980	16.100	16.200	21.000	23.000	33.000	38.000	17.100	25.500	19.400	9.020
4	10.400	7.810	14.200	17.600	23.400	20.600	33.000	39.000	16.100	26.600	18.200	9.000
5	10.200	7.880	15.700	16.400	25.200	20.400	32.600	41.300	16.000	21.800	16.300	9.000
6	10.100	8.800	16.100	15.200	25.000	21.400	31.700	42.800	16.000	21.700	13.900	9.060
7	9.210	8.750	14.900	15.500	22.300	21.700	34.300	31.100	14.600	22.300	15.400	9.530
8	9.800	7.060	15.100	14.400	20.500	21.500	31.800	23.900	12.400	20.100	18.900	9.060
9	10.900	8.860	14.500	12.300	20.800	20.900	26.200	23.800	10.800	19.400	17.500	9.000
10	11.300	6.960	10.900	11.300	21.600	22.200	30.300	23.500	11.100	19.200	13.700	9.060
11	10.300	7.810	11.000	11.100	22.500	22.200	32.500	22.000	10.700	17.800	10.800	9.070
12	9.970	8.150	11.700	15.600	37.600	22.300	27.000	22.300	11.300	18.700	11.100	8.610
13	9.510	7.380	11.100	20.100	43.500	25.700	19.900	25.300	11.500	19.700	10.400	8.620
14	9.740	8.100	10.900	18.900	46.800	27.600	16.100	22.300	9.630	15.400	12.100	8.580
15	9.110	8.150	10.900	16.600	50.000	27.400	15.400	21.400	9.750	11.400	10.200	8.420
16	9.720	8.300	11.500	16.400	50.200	26.000	14.000	20.100	12.500	12.200	11.000	8.330
17	10.000	8.660	11.800	16.900	43.300	22.700	14.100	17.900	10.500	12.000	13.500	8.390
18	9.720	8.930	11.100	18.700	33.200	22.300	15.900	15.000	11.200	10.500	10.200	8.500
19	9.700	9.300	10.900	21.000	35.400	21.800	15.900	13.400	12.800	10.400	8.690	8.480
20	10.200	9.230	10.900	29.000	39.200	24.100	14.900	11.600	13.000	10.300	9.440	8.420
21	8.780	9.380	10.300	45.800	38.800	27.300	13.900	12.100	13.700	10.700	9.350	8.840
22	8.440	10.500	10.600	56.400	36.200	27.400	13.700	11.500	15.300	12.700	8.220	8.470
23	9.340	12.500	10.700	62.800	33.500	27.300	13.000	10.500	21.300	11.700	8.190	8.390
24	8.750	13.700	10.400	66.700	34.000	23.800	13.400	12.500	28.400	11.100	8.170	8.360
25	7.780	14.500	11.400	61.000	28.800	20.400	12.400	10.800	36.300	15.500	8.540	8.640
26	6.730	15.100	11.600	52.600	25.900	20.500	10.600	11.100	31.900	19.500	8.630	8.840
27	7.610	16.100	11.200	48.700	21.400	21.900	10.600	11.800	27.200	19.900	9.110	8.930
28	6.840	17.100	10.100	45.800	20.500	24.500	10.400	10.300	27.600	19.900	9.160	9.140
29	6.900	18.100	10.100	40.500		27.100	10.700	10.600	31.000	20.200	9.480	10.100
30	8.170	21.900	11.300	34.400		29.700	14.500	11.000	31.600	19.300	9.420	8.840
31	8.440		12.000	26.200		31.600		15.000		19.700	9.550	

CHATTAHOOCHEE RIVER AT COLUMBUS, GEORGIA

This sampling point is the Columbus municipal treatment plant water intake which is located in Lake Oliver. The intake can be adjusted from a zero to 40 foot depth in the lake.

There are no significant industrial pollution sources in the area. Raw municipal sewage from a total connected population of approximately 13,000 is discharged into the river between 30-35 miles upstream from the sampling point.

Both Columbus, Georgia and Phenix City, Alabama use the Chattahoochee River for their drinking water requirements.

Station Location:	Chattahoochee River at Columbus, Georgia
Major Basin:	Southeast
Minor Basin:	Chattahoochee River
Station at:	32°33' Latitude 85°02' Longitude
Miles above mouth:	163
Activation Date:	October 1959
Sampled by:	Columbus Water Department
Field Analysis by:	Columbus Water Department
Other Cooperating Agencies:	Georgia Department of Public Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Columbus, Georgia
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	4,670 square miles
Period of record:	1929 to present
Average discharge in record period:	6,398 cfs.

Maximum discharge in record period: 145,000 cfs.

Minimum discharge in record period: 294 cfs.

Remarks: Flow affected by reservoir operations at Lakes Sidney Lanier and Harding.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-4-63	0.10
3-11-63	0.03
3-18-63	0.05
3-25-63	0.05
4-1-63	0.07
4-8-63	0.07
4-15-63	0.08
4-22-63	0.07
5-20-63	0.06
5-27-63	0.06
6-3-63	0.07
6-10-63	0.11
6-17-63	0.18
6-24-63	0.08
7-1-63	0.07
7-8-63	0.05
7-15-63	0.05
7-22-63	0.08
7-29-63	0.08
8-5-63	0.06
8-12-63	0.06
8-19-63	0.10
8-27-63	0.05
9-3-63	0.07
9-9-63	0.07
9-23-63	0.10
9-30-63	0.10

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.15	*.05
	Na	5.0	4.0
	K	2.0	1.2
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	154	22
	Cd	*1	*1
	As	*4	*8
	B	19	32
	P	84	8
	Fe	200	25
	Mo	*4	*4
	Mn	4	*.4
	Al	—	4.6
	Be	*.01	*.02
	Cu	44	14
	Ag	*.1	*.2
	Ni	2	*1
	Co	*1	*1
	Pb	21	*2
	Cr	*1	*2
	V	*1	*4
	Ba	33	12
	Sr	30	24

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.1	.2	April to June	1.5	.2
January to March	—	—	July to September	—	—

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTACHOOCHEE RIVER

STATION LOCATION CHATTACHOOCHEE RIVER AT COLUMBUS, GEORGIA 59

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	12	14	-	-	-	-	-	-	7	5	6	6	13	8						
10	8	62	12	14	-	-	-	-	-	-	1	5	7	6	8	8						
10	15	62	12	17	-	-	-	-	-	-	5	4	10	4	15	6						
10	22	62	12	3	-	-	-	-	-	-	5	3	7	3	12	4						
10	29	62	11	20	-	-	-	-	-	-	1	7	1	6	1	9						
11	26	62	12	12*	1	1	0	0	1	1	17	7	18	6	35	9						
12	26	62	1	16*	0	1	0	1	0	1	9	6	9	6	18	8						
1	28	63	2	20*	0	1	0	1	0	1	22	7	15	6	37	9						
2	28	63	3	11*	0	1	0	0	0	1	30	6	15	5	45	8						
3	25	63	4	17*	1	1	0	1	1	1	35	14	17	6	52	15						
4	29	63	5	22*	0	0	0	0	0	0	14	6	18	6	32	8						
5	27	63	6	19*	1	1	0	1	1	1	38	7	28	6	66	9						
6	24	63	7	24*	0	1	0	0	0	1	12	6	15	6	27	8						
7	29	63	8	19*	0	1	0	0	0	1	12	3	18	3	30	4						
8	26	63	9	25*	0	0	0	1	0	1	8	6	21	11	29	13						
9	30	63	10	31*	0	0	0	1	0	1	0	8	7	6	7	10						

PLANKTON POPULATION

STATE GEORGIA
MAJOR BASIN SOUTHEAST
MINOR BASIN CHATTAHOOCHEE RIVER
STATION LOCATION CHATTAHOOCHEE RIVER AT COLUMBUS, GEORGIA 059

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) (Number per ml)	ROTIFERS										CRUSTACEA											
															GENERA AND COUNT LEVEL (See text for Codes)												GENERA AND COUNT LEVEL (See text for Codes)								
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD				
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT			NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NEMATODES (Identifiable) (Number per liter)	OTHER AERIAL FORMS (Number per liter)
10	1	62	27	44	23	26	57	14	26	3	13	0	0	206	17	5	11	3	18	2	22	1			4	51	1					0	0
10	15	62	27	38	23	36	57	10	70	3	13	0	0	96	11	4	17	1	22	1					15	50	2	51	1	53	1	0	0
11	5	62	27	46	23	42	57	3	92	2	7	0	0	3											3	50	1					0	0
11	26	62										0	0	0											0							0	C
12	3	62	57	11	92	11	2	6	28	5	67	30	0	3											0							0	0
12	17	62	57	59	28	6	56	4	25	4	27	50	0	2											0							0	0
1	7	63	57	27	82	16	92	15	9	11	31	0	0	20	11	1	21	1							0							0	0
1	21	63	57	32	92	14	74	5	65	3	46	0	0	1											1							1	0
2	4	63	57	32	91	24	9	5	23	4	35	0	0	0											1							0	0
2	18	63										0	0	1											0							0	0
3	4	63	57	73	92	4	9	3	61	3	17	-	-	18	11	1	17	1							0							0	C
3	18	63	57	22	92	12	64	6	56	6	54	-	-	1											0							0	0
4	1	63	57	37	92	11	56	8	9	7	37	-	-	60	17	2	22	2	11	1	1	1	16	1	9	76	2	51	1			0	0
4	15	63	82	37	57	21	9	9	25	7	26	-	-	129	11	4	17	3	22	3	21	2	46	1	10	51	2					0	0
5	6	63	57	44	56	10	58	8	70	7	31	-	-	-											-							-	-
5	20	63	56	43	82	26	58	7	57	6	18	-	-	-											-							-	-
6	3	63	56	66	57	16	28	6	9	3	9	-	-	-											-							-	-
6	17	63	56	70	28	5	27	5	92	5	15	-	-	-											-							-	-
7	1	63	82	29	56	27	57	9	27	5	30	-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63	82	22	27	12	23	9	57	9	48	-	-	-											-							-	-
8	19	63										-	-	-											-							-	-
9	3	63	27	47	23	29	70	4	26	3	17	-	-	-											-							-	-
9	16	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT COLUMBUS, GEORGIA

59

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	2600	170	170	770	0	270	0	1140	120	660	40	68	3	38	2	69	2	51	1										
10	15	62	800	0	0	100	0	80	40	410	120	120	0	69	1	68	1														
11	5	62	1400	40	40	290	0	170	0	870	0	0	0	68	3																
11	26	62	200	0	20	0	0	0	30	50	60	50	140																		
12	3	62	200	0	0	0	0	0	50	120	20	20	20																		
12	17	62	300	0	30	0	0	30	0	180	20	0	30																		
1	7	63	200	0	0	20	0	30	0	30	140	30	60																		
1	21	63	200	0	0	0	0	20	20	90	110	20	90																		
2	4	63	200	0	20	30	0	20	0	110	20	50	50																		
2	18	63	500	0	0	0	0	0	350	70	40	40	130	65	2																
3	4	63	400	0	10	0	0	60	100	200	60	60	80																		
3	18	63	200	0	0	0	0	110	90	20	0	0	70																		
4	1	63	500	0	0	70	0	40	200	130	70	0	110	65	1																
4	15	63	1800	0	60	210	0	170	270	1010	80	130	20	69	2	71	2	65	1	68	1	51	1								
5	6	63	200	0	0	20	0	20	0	130	40	90	150																		
5	20	63	500	100	60	60	0	10	10	180	100	0	0																		
6	3	63	700	0	60	60	0	20	80	380	110	80	20	68	2																
6	17	63	1400	110	110	440	0	110	20	290	310	220	110																		
7	1	63	900	20	0	440	0	110	0	110	200	180	20	38	1																
7	15	63	700	0	0	370	0	150	60	100	60	20	0																		
8	5	63	1000	0	130	350	0	150	0	260	110	220	70	25	1																
8	19	63	900	0	120	120	20	0	20	410	190	60	0																		
9	3	63	3400	0	840	910	0	110	0	880	670	370	70	68	3	17	3	88	2	38	2	25	1								
9	16	63	600	50	70	270	0	20	0	90	90	250	20																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE: GEORGIA
MAJOR BASIN: SOUTHEAST
MINOR BASIN: CHATTAHOOCHEE RIVER
STATION LOCATION: CHATTAHOOCHEE RIVER AT COLUMBUS, GEORGIA

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	11	4465	199	78	121	-	-	-	-	-	-	-	-	-	-	-
11	5	62	11	16	4950	199	60	139	-	-	-	-	-	-	-	-	-	-	-
12	3	62	12	17	5940	256	85	171	-	-	-	-	-	-	-	-	-	-	-
12	3	62		*	15355	221	75	146	4	18	18	2	2	13	1	8	9	2	16
1	7	63	1	17	4995	183	72	111	-	-	-	-	-	-	-	-	-	-	-
2	4	63	2	15	4834	221	90	131	4	25	24	3	3	17	1	7	8	2	20
3	4	63	3	15	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	1	63	4	12	4533	174	79	95	3	21	22	3	2	16	1	8	11	1	13
5	6	63	5	20	4100	274	153	121	-	-	-	-	-	-	-	-	-	-	-
6	3	63	6	18	4356#	241	124	117	9	31	29	1	1	25	2	15	18	2	20
7	3	63	7	15	4280	239	122	117	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	16	4130	220	135	85	12	34	32	2	4	26	0	17	17	2	21
9	3	63	9	13	3940	218	110	108	-	-	-	-	-	-	-	-	-	-	-

* FLOW UNKNOWN

\# ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT COLUMBUS, GEORGIA 59

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	23.0	6.1	6.9	1.0	26	1.7	3.2	-	4	17	14	-	10	-	-	-	500
10	8	62	24.0	6.4	7.2	1.6	23	1.6	3.4	-	4	17	16	-	18	-	-	-	100
10	15	62	23.2	4.7	6.9	.2	22	1.1	3.3	-	4	17	16	-	23	-	-	-	780
10	22	62	22.5	5.5	6.7	.7	21	1.2	2.9	-	4	16	16	-	20	-	-	-	100
10	29	62	20.0	6.0	7.0	.4	18	.4	2.2	-	4	15	15	-	19	-	-	-	20
11	5	62	17.0	7.5	7.0	.9	22	1.7	3.2	-	4	16	14	-	7	-	-	-	200
11	13	62	14.0	8.1	6.9	.3	21	1.2	3.0	-	4	17	14	-	14	-	-	-	71
11	19	62	14.0	7.9	6.9	.3	23	1.4	2.9	-	3	15	14	-	17	-	-	-	*6
11	26	62	13.5	9.7	6.8	1.2	31	2.6	5.8	-	2	11	12	-	160	-	-	-	500
12	3	62	12.5	9.0	6.7	.9	26	2.6	5.7	-	2	13	12	-	55	-	-	-	300
12	10	62	10.0	8.8	6.8	.6	18	2.4	4.7	-	3	13	12	-	40	-	-	-	280
12	17	62	9.0	9.9	7.0	.8	17	2.2	3.8	-	4	14	14	-	28	-	-	-	10
12	26	62	8.0	9.8	7.0	1.2	12	2.9	4.9	-	4	16	15	-	18	-	-	-	40
1	2	63	8.0	10.2	6.9	.7	18	2.7	3.8	-	4	15	15	-	31	-	-	-	2500
1	7	63	8.0	9.9	7.0	.8	15	2.4	3.7	-	4	16	16	-	25	-	-	-	50
1	14	63	8.0	10.0	6.9	.7	15	1.9	3.6	-	5	17	16	-	35	-	-	-	830
1	21	63	9.0	11.1	6.9	1.4	13	2.5	6.2	-	3	13	16	-	150	-	-	-	900
1	28	63	7.0	11.1	6.9	.4	12	2.0	4.7	-	3	11	10	-	120	-	-	-	5300
2	4	63	7.0	10.7	6.8	.8	7	1.6	3.7	-	4	14	13	-	40	-	-	-	420
2	11	63	9.0	10.5	7.1	.7	8	1.3	3.2	-	4	14	15	-	38	-	-	-	1400
2	18	63	8.0	10.2	7.1	.7	16	1.6	3.0	-	3	13	28	-	35	-	-	-	2000
2	25	63	8.0	10.6	6.9	.8	13	1.9	3.5	-	3	15	14	-	38	-	-	-	*6
3	4	63	10.0	10.5	7.0	1.0	12	1.2	3.2	-	3	15	15	-	38	-	-	-	430
3	11	63	13.0	9.7	7.0	.6	21	2.2	5.2	-	3	12	12	-	225	-	-	-	6000
3	18	63	17.0	9.1	7.0	1.4	20	1.8	4.7	-	2	10	15	-	230	-	-	-	3000
3	25	63	16.0	8.2	7.0	.2	17	1.6	3.7	-	2	13	13	-	110	-	-	-	800
4	1	63	18.0	8.6	7.1	.6	18	1.4	3.9	-	2	15	15	-	72	-	-	-	230
4	8	63	17.0	7.6	7.2	.4	17	1.6	3.4	-	3	14	15	-	45	-	-	-	*6
4	15	63	18.0	7.6	7.3	.4	14	1.6	3.3	-	3	16	18	-	35	-	-	-	140
4	22	63	19.0	6.8	7.2	.4	15	1.2	2.6	-	3	17	12	-	18	-	-	-	100
4	29	63	20.0	7.5	7.3	.6	15	1.0	2.0	-	3	16	13	-	13	-	-	-	350
5	6	63	19.0	8.6	6.9	1.0	22	2.4	5.4	-	2	10	16	-	215	-	-	-	3800
5	13	63	20.0	8.6	7.1	.8	18	1.0	3.0	-	2	13	13	-	40	-	-	-	-
5	20	63	22.0	8.1	7.1	.9	14	1.6	3.0	-	2	14	14	-	38	-	-	-	-
5	27	63	23.0	7.1	7.2	.8	15	1.2	3.0	-	3	15	13	-	14	-	-	-	100
6	3	63	24.0	7.6	7.2	1.3	19	1.0	4.2	-	3	16	17	-	45	-	-	-	100
6	10	63	26.0	7.0	7.2	1.0	19	1.8	4.0	-	3	15	15	-	42	-	-	-	370
6	17	63	27.5	6.8	7.4	1.5	20	1.7	4.0	-	4	16	16	-	19	-	-	-	200

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT COLUMBUS, GEORGIA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	24	63	25.0	6.9	7.0	.3	20	2.6	4.9	-	-	-	-	-	-	-	-	-	5000
7	1	63	25.5	6.8	7.2	.7	20	2.5	4.8	-	3	15	14	-	118	-	-	-	200
7	8	63	26.5	6.6	7.3	1.0	16	2.2	4.3	-	3	16	14	-	40	-	-	-	500
7	15	63	25.5	6.5	7.2	.9	15	1.6	3.4	-	-	-	-	-	-	-	-	-	200
7	22	63	26.0	7.0	7.4	.9	16	1.4	3.3	-	-	-	-	-	-	-	-	-	1000
7	29	63	25.0	6.1	7.1	.5	14	1.4	3.2	-	4	14	16	-	36	-	-	-	500
8	5	63	27.0	6.2	7.2	1.0	15	1.2	3.3	-	4	15	15	-	39	-	-	-	90
8	12	63	28.0	5.9	7.3	.9	13	1.2	3.3	-	4	17	16	-	22	-	-	-	55
8	19	63	28.5	6.1	7.3	.8	13	1.4	3.6	-	5	18	17	-	19	-	-	-	130
8	26	63	28.0	7.0	7.5	2.0	13	1.8	3.4	-	5	18	17	-	18	-	-	-	230
9	3	63	27.0	6.5	7.8	.6	15	1.4	3.4	-	3	17	14	-	8	-	-	-	90
9	9	63	27.0	5.8	7.5	1.8	14	1.5	3.5	-	4	17	17	-	8	-	-	-	120
9	16	63	26.0	2.3	7.1	1.0	12	1.3	3.3	-	4	18	18	-	10	-	-	-	500
9	23	63	24.0	4.4	7.2	.6	11	.6	3.4	-	3	18	16	-	12	-	-	-	150
9	30	63	23.0	5.3	7.3	.7	11	.8	2.6	-	3	17	16	-	18	-	-	-	120

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Columbus, Georgia
Operated by U.S. Geological Survey

STATE Georgia

MAJOR BASIN Southeast

MINOR BASIN Chattahoochee River

STATION LOCATION Chattahoochee River at Columbus, Georgia

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	3.600	4.030	5.560	6.350	9.020	4.350	7.000	35.600	9.780	10.200	5.020	1.460
2	5.150	4.190	6.210	6.450	8.930	4.690	6.990	36.700	4.010	9.320	6.250	1.290
3	6.670	3.150	6.400	3.070	7.330	1.710	6.420	27.400	6.490	10.400	4.750	4.990
4	7.980	2.390	4.430	4.820	8.730	4.680	6.540	15.800	5.830	8.210	2.200	4.610
5	8.290	4.910	3.760	1.480	7.020	6.790	7.110	10.300	2.830	8.410	4.790	5.170
6	7.540	4.030	5.400	1.360	7.620	12.500	7.040	11.400	4.750	8.850	4.730	3.000
7	3.960	7.170	2.070	2.380	8.690	22.800	5.300	11.600	3.770	6.970	4.480	1.390
8	5.510	6.060	1.400	3.830	8.970	23.200	8.120	11.600	3.890	8.410	2.710	1.260
9	1.960	9.300	1.350	3.510	7.560	14.000	6.490	11.600	1.660	8.110	3.250	2.880
10	3.590	6.600	1.720	3.440	9.950	11.800	5.470	11.300	5.620	9.050	3.480	1.920
11	3.200	5.240	2.740	5.590	8.110	10.600	7.270	11.400	4.290	6.490	1.950	2.550
12	2.520	8.100	1.680	4.250	10.200	7.920	6.180	11.700	1.680	2.310	4.860	4.080
13	1.390	6.450	1.440	7.200	9.280	19.900	6.850	10.800	1.600	2.840	5.130	3.090
14	1.320	7.350	3.370	6.990	10.300	28.900	4.300	7.240	2.100	4.910	3.870	1.540
15	4.490	6.410	3.910	6.660	7.410	26.700	6.420	7.110	4.130	6.590	2.980	1.280
16	2.200	6.780	2.500	7.010	2.950	19.000	6.640	5.830	1.760	5.030	3.660	3.250
17	3.220	4.990	1.400	7.300	2.090	11.400	5.850	6.520	1.900	8.930	4.000	4.020
18	2.700	4.350	1.500	11.100	4.280	7.710	5.300	4.570	4.830	7.230	4.650	2.830
19	1.340	7.200	1.600	9.280	10.700	6.610	3.560	1.480	4.980	8.930	6.700	2.430
20	.779	9.460	1.820	24.100	7.760	9.700	5.390	4.470	6.770	7.920	4.960	2.220
21	.890	7.670	3.100	37.900	9.290	9.070	1.660	5.040	8.550	8.760	4.860	1.650
22	1.670	19.100	2.460	26.500	10.400	7.110	5.450	6.160	12.600	8.850	5.770	1.220
23	3.840	36.200	1.380	12.400	4.010	7.350	7.190	3.570	15.300	8.810	6.140	1.190
24	3.220	26.700	1.570	11.300	5.280	9.590	4.450	5.410	13.100	4.050	5.210	1.180
25	3.620	11.500	2.970	6.420	5.830	7.200	6.220	2.270	11.800	7.070	2.920	1.180
26	3.460	8.840	6.750	7.430	5.630	6.190	5.320	3.120	8.820	9.290	6.940	2.350
27	.825	9.310	4.940	9.350	5.450	9.280	5.790	5.350	11.900	9.140	7.210	3.360
28	.826	5.700	6.580	8.140	3.650	9.960	6.340	8.510	9.020	8.020	5.050	2.650
29	2.000	6.080	6.360	6.810		7.450	10.300	10.100	10.700	7.400	5.200	4.790
30	6.060	6.170	7.670	9.370		7.290	13.800	11.400	10.200	5.830	6.020	4.860
31	4.250		8.120	8.390		7.460		4.920		5.430	3.780	

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CHATTAHOOCHEE RIVER AT LANETT, ALABAMA

This sampling point is the raw water intake for the West Point Manufacturing Company near the Georgia-Alabama State line. The city of Lanett, Alabama receives its supply from the same source. Approximately 19 miles downstream from this station is the dam for Bartletts Ferry Reservoir constructed by the Georgia Power Company.

Upstream municipal discharges include raw sewage from West Point, Georgia with a sewered population of 3,900, and secondary effluent from LaGrange, Georgia with a population equivalent of 2,000. The cities of Lanett, Alabama (population served, 10,000) and West Point, Georgia (population served, 4,500) obtain their water supply from the Chattahoochee in this vicinity.

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Station Location: Chattahoochee River at Lanett, Alabama

Major Basin: Southeast

Minor Basin: Chattahoochee River

Station at: 32°52' Latitude 85°11' Longitude

Miles above mouth: 197

Activation Date: June 7, 1962

Sampled by: West Point Manufacturing Company

Field Analysis by: West Point Manufacturing Company

Other Cooperating Agencies: Alabama State Department of Health
Alabama Water Improvement Commission

Hydrologic Data:

Nearest pertinent gaging station: At West Point, Georgia

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 3,550 square miles

Period of record: 1896 to present

Average discharge in record period: 5,533 cfs.

Maximum discharge in record period: 134,000 cfs.

Minimum discharge in record period: 224 cfs.

Remarks: Flow regulated by Lake Sidney Lanier. Average discharge unadjusted for Lake Lanier storage.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-1-63	0.06
7-8-63	0.06
7-15-63	0.09
7-22-63	0.08
7-29-63	0.08
8-5-63	0.09
8-12-63	0.10
8-19-63	0.07
8-26-63	0.06
9-2-63	0.08
9-9-63	0.07
9-23-63	0.10
9-30-63	0.13

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	*.01	.05
	Na	5.0	4.0
	K	2.3	1.2
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	28	51
	Cd	*1	*1
	As	*5	*10
	B	24	32
	P	30	18
	Fe	43	15
	Mo	*4	*3
	Mn	*.3	*.5
	Al	–	*5
	Be	*.01	*.03
	Cu	6	11
	Ag	*.1	*.3
	Ni	*1	3
	Co	*1	*1
	Pb	*1	*3
	Cr	*1	*3
	V	*1	10
	Ba	38	10
	Sr	20	20

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.8	.2	April to June	–	–
January to March	3.6	.4	July to September	2.0	.3

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
11/8 - 11/19/62	DDT	
1/8 - 1/21/63	DDT	
6/5 - 6/13/63	Dieldrin	0.012
	DDT	0.009
	Aldrin	0.002
7/9 - 7/17/63	Dieldrin	0.004
	DDT	0.011
	DDD	0.004
8/11 - 8/20/63	Dieldrin	0.002
	DDD	0.001

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE ALABAMA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT LANETT, ALABAMA

120

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA								DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL					ALPHA		BETA	
MO	DAY	YR.	MO. DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±			MO. DAY	pc/g	±	pc/g	±
10	1	62	10 23	1	1	0	1	1 1	0	6	11	5	11	8							
10	8	62	11 1	1	1	0	1	1 1	15	6	10	5	25	8							
10	29	62	11 20	0	1	0	0	0 1	8	6	17	6	25	8							
11	5	62	12 10	0	0	0	0	0 0	2	7	9	7	11	10							
11	12	62	12 2	1	1	0	1	1 1	42	6	17	4	59	7							
11	19	62	12 18	1	1	0	0	1 1	10	6	10	6	20	8							
11	26	62	12 17	2	2	0	0	2 2	34	12	11	5	45	13							
12	2	62	12 28	0	0	0	0	0 0	9	6	9	6	18	8							
12	10	62	1 2	0	1	0	0	0 1	6	4	6	4	12	6							
12	17	62	1 10	0	1	0	1	0 1	5	6	11	6	16	8							
12	24	62	1 11	0	1	0	0	0 1	11	5	15	5	26	7							
12	30	62	1 15	3	1	0	1	3 1	26	7	12	6	38	9							
1	7	63	1 21	0	0	0	0	0 0	10	3	11	3	21	4							
1	14	63	1 30	24	9	0	1	24 9	133	43	29	6	162	43							
1	21	63	2 1	4	2	0	0	4 2	75	9	29	5	104	10							
1	28	63	2 14	0	1	0	0	0 1	25	7	20	6	45	9							
2	4	63	2 18	2	2	0	1	2 2	66	8	27	3	93	8							
2	11	63	2 25	4	2	1	1	5 2	209	12	42	4	251	13							
2	18	63	3 7	0	1	0	1	0 1	15	7	15	6	30	9							
2	25	63	4 5	1	1	0	1	1 1	20	5	12	5	32	7							
3	4	63	3 22	0	0	0	0	0 0	13	6	13	5	26	8							
3	11	63	3 25	8	3	0	0	8 3	59	9	16	3	75	10							
3	18	63	4 4	2	1	0	0	2 1	23	13	17	6	40	14							
3	25	63	4 10	1	1	0	1	1 1	24	7	20	6	44	9							
4	29	63	5 31*	0	1	0	0	0 1	18	4	13	4	31	6							
5	27	63	6 25*	0	1	0	0	0 1	3	6	14	5	17	8							
6	24	63	8 6*	1	1	0	0	1 1	32	13	16	6	48	14							
7	29	63	8 23*	1	2	0	1	1 2	60	15	20	6	80	16							
8	26	63	10 14*	1	1	0	0	1 1	7	3	9	3	16	4							
9	30	63	11 20*	1	1	0	1	1 1	12	5	11	4	23	6							

PLANKTON POPULATION

STATE ALABAMA
MAJOR BASIN SOUTHEAST
MINOR BASIN CHATTAHOOCHEE RIVER
STATION LOCATION CHATTAHOOCHEE RIVER AT LANETT, ALABAMA 120

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																											
			1ST		2ND		3RD		4TH				ROTIFERS														CRUSTACEA								NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
													PROTOZOA (Identifiable) (Number per ml)	NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)									
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
10	1	62	57	12	92	12	62	6	65	5	65	-	-	1											2								0	0
10	15	62	92	13	62	12	53	7	65	7	61	-	-	0											0								0	0
11	5	62	92	30	54	16	64	8	62	6	40	-	-	0											0								0	0
11	19	62	92	13	53	10	62	10	57	7	60	-	-	0											0								0	0
12	2	62										20	0	3											0								2	0
12	17	62										-	-	0											0								0	0
1	7	63	62	37	92	18	54	5	64	5	35	-	-	1											0								2	0
1	21	63										-	-	0											0								0	0
2	4	63	82	23	2	9	80	7	46	5	56	-	-	0											0								0	0
2	18	63										-	-	3											0								1	0
3	4	63	92	46	65	8	51	7	64	6	33	-	-	3											0								0	0
3	18	63	92	39	62	10	70	5	65	4	42	-	-	0											0								0	0
4	1	63	92	14	57	13	9	13	62	8	52	-	-	0											0								0	0
4	15	63	92	30	62	9	9	9	95	6	46	-	-	1											0								0	0
5	6	63	92	23	9	14	95	11	32	6	46	-	-	-											-								-	-
5	20	63	56	19	9	16	95	9	25	8	48	-	-	-											-								-	-
6	3	63	56	12	92	11	57	7	95	7	63	-	-	-											-								-	-
6	17	63	56	30	28	22	26	11	92	5	32	-	-	-											-								-	-
7	1	63										-	-	-											-								-	-
7	15	63										-	-	-											-								-	-
8	5	63										-	-	-											-								-	-
8	19	63										-	-	-											-								-	-
9	2	63										-	-	-											-								-	-
9	16	63	26	20	28	9	70	9	56	6	56	-	-	-											-								-	-

PLANKTON POPULATION

STATE ALABAMA
MAJOR BASIN SOUTHEAST
MINOR BASIN CHATTAHOOCHEE RIVER
STATION LOCATION CHATTAHOOCHEE RIVER AT LANETT, ALABAMA 120

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per mL (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	200	0	0	70	0	10	0	40	60	20	170																		
10	15	62	900	40	100	100	0	100	0	170	370	0	80																		
11	5	62	300	40	0	0	0	0	0	80	170	0	0																		
11	19	62	100	0	30	0	0	0	0	20	20	20	80																		
12	2	62	100	0	0	30	0	20	30	20	30	20	30																		
12	17	62	00	0	0	20	0	20	0	0	0	0	30																		
1	7	63	100	0	0	20	0	20	0	0	110	0	60																		
1	21	63	100	0	0	0	0	0	20	0	80	20	50																		
2	4	63	200	0	0	0	0	30	20	60	80	0	90																		
2	18	63	300	0	20	0	0	0	220	0	20	0	40	65	1																
3	4	63	300	0	0	0	0	0	90	40	130	0	110																		
3	18	63	400	0	10	10	0	0	170	40	130	0	110																		
4	1	63	1200	20	20	290	20	170	360	40	270	20	230	63	1	38	1	51	1												
4	15	63	400	0	10	10	0	30	80	70	180	10	70																		
5	6	63	500	0	0	20	0	0	0	170	270	0	130																		
5	20	63	100	0	0	20	0	0	0	20	90	0	110																		
6	3	63	300	0	20	40	0	20	0	80	130	40	130																		
6	17	63	5700	170	0	4030	0	500	0	840	170	40	170	38	5	24	4	68	3	26	2	51	2	59	1	3	1	25	1	69	1
7	1	63	00	0	0	0	0	0	0	0	20	0	80																		
7	15	63	00	0	0	0	0	0	0	0	40	20	60																		
8	5	63	500	0	0	480	0	40	0	0	20	20	20	38	2																
8	19	63	200	0	0	40	0	0	0	80	80	0	20																		
9	2	63	200	0	0	70	0	0	0	90	0	40	70																		
9	16	63	1300	70	0	520	0	90	0	270	380	70	200	38	2	68	1														

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE ALABAMA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT LANETT, ALABAMA 120

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	6	62	10	14	5010	184	82	102	2	21	27	4	2	20	1	8	9	2	13
11	8	62	11	19	5070	151	99	52	2	32	28	5	3	20	0	10	11	2	14
12	8	62	12	17	4930	234	128	106	4	31	50	8	5	36	1	14	18	3	8
1	8	63	1	21	4980	287	106	181	1	27	35	5	4	25	1	13	12	2	16
2	8	63	2	22	3055	288	128	160	5	33	40	7	4	27	2	13	12	3	22
3	11	63	3	25	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	18	63	4	26	4830	193	106	87	7	28	34	7	4	23	0	12	14	2	9
5	7	63	5	14	4940#	110	46	64	6	10	12	3	2	7	0	4	5	1	8
6	5	63	6	13	5040	155	64	91	3	15	21	3	2	16	0	8	7	1	9
7	9	63	7	17	5000	182	95	87	7	28	22	1	2	17	2	12	9	1	16
8	11	63	8	20	5350	164	83	81	7	22	23	2	2	19	0	8	13	2	8
9	8	63	9	15	5000	210	85	125	2	23	30	2	3	24	1	7	9	2	12

* FLOW UNKNOWN

\# ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE ALABAMA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT LANETT, ALABAMA 120

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	19.0	-	6.9	-	-	-	-	-	-	12	12	-	38	-	-	-	11000
10	8	62	21.5	-	6.8	-	-	-	-	-	-	12	14	-	94	-	-	-	19000
10	15	62	21.0	-	6.8	-	-	-	-	-	-	13	16	-	36	-	-	-	13000
10	22	62	20.0	-	6.9	-	-	-	-	-	-	15	14	-	26	-	-	-	4000
10	29	62	12.4	9.3	7.0	-	7	1.3	3.5	.6	5	13	16	5	25	7	.1	40	4000
11	6	62	11.1	9.5	6.8	-	12	1.9	3.5	.8	6	12	12	0	*25	4	.1	47	32000
11	13	62	13.2	8.6	6.7	1.7	25	1.3	3.0	.8	-	12	12	5	92	10	.0	-	80000
11	19	62	14.5	8.3	6.7	1.2	16	11.5	28.4	.7	5	12	14	5	43	10	.1	45	95000
11	26	62	10.8	9.6	6.6	1.8	18	1.7	4.0	.8	5	11	12	5	100	5	.0	30	100000
12	3	62	13.8	9.6	7.0	1.4	12	1.6	3.7	.8	6	17	16	5	*25	6	.0	81	9000
12	10	62	9.0	10.8	6.9	1.4	12	1.6	3.2	.8	6	19	22	5	*25	8	.0	82	21000
12	17	62	5.0	11.6	8.0	2.1	12	.9	1.9	1.2	5	24	28	5	*25	4	.0	40	4600
12	24	62	9.0	9.8	7.7	.9	24	.8	3.6	.8	9	24	32	0	*25	8	.0	65	4400
12	30	62	10.5	10.4	7.5	1.2	12	1.1	3.4	.8	9	20	40	-	*25	14	.0	50	-
12	31	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60000
1	7	63	7.6	10.8	7.6	.7	7	2.4	3.5	.9	5	24	24	-	*25	6	.1	50	8200
1	14	63	7.0	9.2	7.7	3.6	31	1.7	4.5	.8	5	18	28	-	275	20	.0	60	310000
1	21	63	8.0	10.0	7.0	3.8	35	1.6	2.4	.8	4	12	28	-	110	5	.0	60	47000
1	28	63	3.0	12.0	6.7	1.9	14	1.7	3.4	.9	7	16	32	-	100	3	.1	67	1000
2	4	63	6.0	10.6	8.0	2.4	22	1.9	4.6	.8	6	16	20	-	40	4	.0	41	26000
2	11	63	10.4	9.4	7.3	4.9	20	2.6	4.7	1.0	5	18	44	5	*25	6	.0	60	5000
2	13	63	-	-	6.9	-	-	-	-	-	4	20	20	0	*25	4	.0	50	-
2	18	63	7.0	11.4	6.8	1.0	12	.9	3.4	.9	-	15	14	-	*25	-	-	-	7000
2	25	63	7.5	11.0	7.3	1.5	14	1.7	3.6	.9	5	16	20	5	*25	4	.0	45	17000
3	4	63	11.2	9.8	6.9	1.1	11	1.9	3.9	.9	-	16	16	-	*25	-	-	-	5200
3	11	63	12.4	9.5	6.7	1.8	24	2.1	4.6	.9	4	12	16	10	95	4	.0	61	150000
3	18	63	16.5	8.6	6.5	1.3	16	6.4	11.0	1.0	4	11	14	10	*25	2	.2	25	23000
3	25	63	13.8	9.5	6.8	.7	16	1.4	3.2	1.1	5	14	14	5	39	3	.0	31	11000
4	1	63	17.2	8.5	6.8	1.3	19	.9	2.7	1.2	6	14	14	5	39	5	.0	32	19000
4	8	63	15.8	8.6	6.9	.8	12	1.0	2.5	1.0	4	15	14	5	*25	3	.0	43	6400
4	15	63	14.8	8.8	6.8	1.3	22	1.1	2.4	1.0	5	20	16	0	*25	4	.0	40	110000
4	22	63	20.0	7.7	6.7	1.0	16	1.2	3.9	.8	3	20	24	0	*25	3	.0	50	5000
5	6	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	130000
5	20	63	21.0	7.7	6.8	.7	21	1.1	2.6	-	4	16	16	5	*25	4	.0	49	20000
5	27	63	21.5	7.7	6.9	.6	21	1.2	2.7	.9	4	20	40	5	*25	5	.0	55	5000
6	3	63	19.0	7.8	6.7	1.0	28	1.3	3.5	.9	3	12	20	0	*25	4	.0	33	44000
6	10	63	26.5	6.9	6.9	.7	15	1.2	3.3	.9	7	28	24	0	*25	2	.0	40	1000
6	17	63	28.5	7.2	7.7	1.2	15	1.1	1.7	.9	7	20	28	5	*25	4	.1	66	22000

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE ALABAMA
MAJOR BASIN SOUTHEAST
MINOR BASIN CHATTAHOOCHEE RIVER
STATION LOCATION CHATTAHOOCHEE RIVER AT LANETT, ALABAMA

120

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	24	63	21.5	7.0	6.4	2.0	28	2.1	5.9	.9	6	18	20	15	125	8	.0	63	67000
6	30	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7800
7	1	63	23.0	6.9	6.7	1.8	29	2.7	8.1	.9	4	16	18	5	195	5	.0	45	–
7	8	63	22.0	7.3	6.7	.8	25	1.2	4.1	.8	6	18	28	0	*25	3	.0	53	80000
7	15	63	20.0	7.6	6.7	1.2	27	1.3	3.3	.7	4	16	28	0	*25	5	.1	38	170000
7	22	63	22.5	7.1	6.7	1.6	15	1.4	4.6	1.0	5	20	32	0	*25	4	.0	31	57000
7	29	63	25.2	7.0	6.9	.7	16	2.2	5.2	.9	6	20	32	5	42	6	.0	41	23000
8	5	63	26.5	7.5	6.8	1.1	16	2.1	5.2	.8	6	18	32	5	*25	5	.1	44	8500
8	12	63	27.5	6.9	7.1	.5	13	1.5	3.1	.4	7	18	22	5	*25	5	.2	43	10000
8	19	63	22.5	7.3	6.7	.6	18	1.6	3.3	.9	5	14	24	5	*25	4	.0	39	14000
8	26	63	22.0	7.5	6.7	.6	13	1.6	3.8	.9	10	14	24	0	*25	5	.0	41	170000
9	2	63	23.0	7.6	6.9	.7	8	1.4	3.6	1.2	8	16	22	0	*25	5	.0	40	20000
9	9	63	23.5	7.3	6.9	.7	14	1.3	3.2	.8	9	16	28	5	*25	6	.3	45	20000
9	16	63	24.0	7.3	7.0	.9	9	1.4	2.9	.9	4	20	20	0	*25	7	.0	48	10000
9	23	63	23.0	7.8	7.3	1.4	14	1.6	4.2	1.0	6	26	20	5	*25	7	.2	65	–
9	24	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7200
9	30	63	18.5	4.2	6.6	4.6	40	2.9	7.6	.9	6	38	18	5	*25	7	.1	53	170000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at West Point, Georgia
Operated by U.S. Geological Survey

STATE: Alabama

MAJOR BASIN: Southeast

MINOR BASIN: Chattahoochee River

STATION LOCATION: Chattahoochee River at Lanett, Alabama

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	2.560	4.990	3.280	4.070	5.500	3.620	4.450	34.400	7.110	8.030	5.110	4.950
2	2.100	4.650	3.110	3.530	5.000	3.850	3.980	32.300	7.770	7.170	5.020	3.080
3	3.300	4.670	2.950	3.420	6.720	4.220	4.300	22.600	4.400	8.470	4.060	1.870
4	7.570	4.620	2.710	3.260	8.970	4.020	4.660	10.800	2.700	8.600	3.610	2.280
5	9.590	3.060	2.790	3.070	7.110	3.920	4.580	10.200	3.240	8.120	2.850	3.570
6	5.010	2.370	2.870	2.970	5.680	13.500	4.560	11.700	3.590	7.860	2.550	4.070
7	4.020	4.500	2.950	2.830	5.050	23.400	4.730	11.100	3.470	7.920	2.760	3.730
8	2.800	6.190	2.790	2.630	4.510	17.800	4.450	11.400	3.420	5.490	4.610	3.590
9	2.390	7.060	2.870	2.650	4.240	10.600	3.890	11.200	3.300	3.810	3.860	2.500
10	2.410	8.660	2.630	2.710	3.970	7.570	6.230	11.100	2.360	4.470	3.210	1.590
11	2.840	8.010	2.390	2.850	3.840	5.420	7.840	10.400	2.020	4.760	3.060	1.620
12	3.180	7.340	2.410	5.580	4.540	5.040	7.800	8.700	2.240	6.050	2.450	2.170
13	3.180	5.390	2.380	9.850	5.370	20.600	7.690	4.920	2.240	7.190	2.030	2.240
14	3.060	7.100	2.360	6.630	4.660	30.300	7.320	3.810	2.190	7.190	4.140	2.270
15	2.430	5.490	2.450	4.850	4.190	23.800	4.360	4.990	2.200	4.080	6.220	2.360
16	1.720	5.150	2.450	3.980	3.940	12.400	3.320	5.140	2.120	2.880	6.160	2.420
17	1.740	7.470	2.450	3.660	3.710	8.540	3.670	6.500	2.500	5.220	6.060	1.790
18	2.620	7.930	2.340	6.520	3.510	7.130	4.610	6.010	5.990	8.190	5.880	1.640
19	2.670	4.830	2.500	11.900	4.510	6.560	4.680	5.720	6.990	9.210	3.500	1.780
20	2.690	3.450	2.500	15.700	7.690	6.080	4.720	4.010	6.560	8.330	2.330	1.930
21	2.670	13.000	2.620	18.400	6.990	6.110	5.110	3.130	8.580	8.910	4.730	1.840
22	2.290	33.600	2.590	13.500	5.360	5.570	4.350	3.790	12.600	6.020	6.410	1.730
23	1.760	29.900	3.020	8.490	4.680	5.040	3.530	4.580	13.500	3.700	6.300	1.560
24	2.020	18.200	3.060	6.220	4.250	4.540	5.120	4.230	10.700	6.470	6.080	1.350
25	2.980	11.100	3.000	5.200	4.080	4.310	6.530	4.110	7.550	11.100	5.700	1.350
26	2.860	5.740	4.730	4.620	3.760	6.640	6.800	4.070	7.710	12.400	3.230	1.470
27	2.930	4.040	6.020	4.390	3.690	8.250	6.720	4.000	9.690	7.070	2.000	1.920
28	2.960	3.620	4.690	4.240	3.740	6.740	6.370	6.860	10.400	5.120	3.590	2.160
29	2.790	3.360	4.250	3.870		5.210	5.340	9.790	9.020	4.080	5.130	5.640
30	2.140	3.530	4.790	3.980		4.750	21.000	8.800	8.760	4.640	5.400	7.840
31	3.620		5.020	5.220		4.450		5.580		5.010	5.290	

CHATTAHOOCHEE RIVER AT ATLANTA, GEORGIA

Samples are collected from the municipal water treatment plant intake located approximately 200 feet upstream from where Peachtree Creek joins the Chattahoochee River. Morgan Falls hydroelectric plant is 10 miles upstream and Sidney Lanier Reservoir is 48 miles upstream from the station.

The city of Atlanta (population 500,000) and nearby Cobb, DeKalb, and Gwinnet counties utilize the river as their water supply.

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Station Location: Chattahoochee River at Atlanta, Georgia

Major Basin: Southeast

Minor Basin: Chattahoochee River

Station at: 33°50' Latitude 84°28' Longitude

Miles above mouth: 300

Activation Date: May 1960

Sampled by: Atlanta Water Department

Field Analysis by: Atlanta Water Department

Other Cooperating Agencies: Georgia Department of Public Health

Hydrologic Data:

Nearest pertinent gaging station: At Atlanta, Georgia

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 1,450 square miles

Period of record: 1928-1931; 1936 to present

Average discharge in record period: 2,447 cfs.

Maximum discharge in record period: 59,000 cfs.

Minimum discharge in record period: 296 cfs. (daily)

Remarks: Flows regulated by operation of Lake Sidney Lanier. Diversions above gaging station for municipal supplies. Diurnal fluctuations in flow caused by operations of upstream power plant. Discharge values are unadjusted.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-3-63	0.03
7-10-63	0.02
7-17-63	0.03
7-23-63	0.03
7-31-63	0.03
8-7-63	0.03
8-14-63	0.02
8-21-63	0.02
8-28-63	0.08
9-4-63	0.11
9-11-63	0.04
9-25-63	0.07

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.10	.05
	Na	3.0	3.0
	K	1.5	1.2
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	5	26
	Cd	*1	*1
	As	5	*3
	B	18	12
	P	54	4
	Fe	162	13
	Mo	3	*4
	Mn	.9	.7
	Al	–	11
	Be	*.01	*.01
	Cu	9	9
	Ag	*.1	*.1
	Ni	17	*1
	Co	*1	*1
	Pb	*1	*1
	Cr	1	1
	V	*1	*2
	Ba	11	6
	Sr	20	20

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.0	.2	April to June	1.6	.3
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT ATLANTA, GEORGIA

53

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO.	DAY	YR.	MO. DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
10	3	62	11 7	0	0	0	0	0 0	8	5	8	5	16	7					
10	10	62	11 1	-	-	-	-	- -	1	5	2	5	3	7					
10	17	62	12 15	-	-	-	-	- -	4	5	4	4	8	7					
11	26	62	12 15*	1	1	0	0	1 1	9	5	17	4	26	6					
12	26	62	1 18*	0	1	0	0	0 1	6	6	9	6	15	8					
2	27	63	3 18*	1	0	0	0	1 0	19	3	8	3	27	4					
3	26	63	4 17*	3	1	5	3	8 3	115	18	21	6	136	19					
4	17	63	5 22*	0	1	0	0	0 1	18	7	11	5	29	9					
5	29	63	6 19*	2	1	0	0	2 1	32	7	14	5	46	9					
6	24	63	7 24*	0	0	0	0	0 0	24	6	12	5	36	8					
7	31	63	8 19*	1	1	0	1	1 1	13	3	0	3	13	4					
8	28	63	9 25*	1	1	0	0	1 1	18	11	8	5	26	12					
9	23	63	10 29*	0	0	0	0	0 0	8	6	11	5	19	8					

PLANKTON POPULATION

STATE GEORGIA
MAJOR BASIN SOUTHEAST
MINOR BASIN CHATTAHOOCHEE RIVER
STATION LOCATION CHATTAHOOCHEE RIVER AT ATLANTA, GEORGIA 058

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																				
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Flagellates) (Number per ml.)	ROTIFERS										CRUSTACEA										
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)						NEMATODES (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	3	62	57	26	68	8	96	5	64	4	57	20	0	0										0							0	0
10	17	62	62	26	57	14	2	5	28	4	51	0	0	1										0							0	0
11	5	62	96	18	43	16	32	9	64	9	48	80	0	0										0							0	0
11	21	62	57	16	50	10	28	10	43	9	55	0	0	0										0							0	0
12	5	62										80	0	0										0							0	0
12	19	62	2	11	25	9	28	7	9	5	68	0	0	0										0							0	0
1	7	63	82	30	80	24	62	17	92	7	22	0	0	0										0							0	0
1	23	63										0	0	2										0							0	0
2	6	63										0	0	1										0							0	0
2	20	63	92	14	51	10	9	9	25	7	60	10	0	1										0							0	0
3	6	63	92	66	74	8	50	6	50	4	16	-	-	0										0							0	0
3	20	63										-	-	0										0							0	0
4	3	63	57	38	92	11	95	5	46	4	42	-	-	2										0							1	0
4	17	63	9	49	25	10	82	7	92	5	29	-	-	3										0							0	0
5	8	63										-	-	-										-							0	-
5	21	63										-	-	-										-							-	-
6	5	63	2	24	57	9	56	5	30	5	57	-	-	-										-							-	-
6	19	63	82	38	56	13	9	8	89	6	35	-	-	-										-							-	-
7	3	63										-	-	-										-							-	-
7	17	63										-	-	-										-							-	-
8	7	63										-	-	-										-							-	-
8	21	63										-	-	-										-							-	-
9	3	63	2	14	95	10	28	7	97	6	63	-	-	-										-							-	-
9	18	63										-	-	-										-							-	-

PLANKTON POPULATION

STATE GEORGIA
MAJOR BASIN SOUTHEAST
MINOR BASIN CHATTAHOOCHEE RIVER
STATION LOCATION CHATTAHOOCHEE RIVER AT ATLANTA, GEORGIA 58

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	3	62	300	60	10	30	0	20	0	70	130	60	40																		
10	17	62	200	10	0	20	0	0	0	40	90	0	0																		
11	5	62	200	0	0	0	0	0	0	80	120	30	230																		
11	21	62	600	0	0	0	0	0	60	40	460	80	40																		
12	5	62	00	0	0	0	0	0	0	0	20	0	30																		
12	19	62	100	0	0	20	0	20	0	50	0	0	20																		
1	7	63	100	0	0	20	0	30	20	20	0	0	0																		
1	23	63	100	0	0	0	0	60	0	30	30	0	60																		
2	6	63	100	0	0	0	0	20	0	0	50	0	20																		
2	20	63	500	0	10	10	0	0	410	40	0	40	110	60	1																
3	6	63	400	0	0	0	0	0	40	40	290	0	590	92	1																
3	20	63	300	0	0	40	0	90	110	0	70	20	0																		
4	3	63	100	0	0	30	0	20	0	0	30	20	50																		
4	17	63	200	0	0	0	0	0	0	20	150	0	20																		
5	8	63	200	0	0	40	0	0	0	40	130	20	110																		
5	21	63	200	0	0	20	0	0	0	30	110	20	60																		
6	5	63	300	0	40	0	0	0	20	40	210	40	60																		
6	19	63	100	0	20	30	0	0	0	30	60	20	140																		
7	3	63	300	0	20	20	0	0	0	110	150	40	0																		
7	17	63	00	0	0	0	0	0	0	0	0	0	60																		
8	7	63	200	0	0	40	0	0	0	20	100	20	170																		
8	21	63	100	0	0	20	0	0	0	0	90	110	90																		
9	3	63	200	0	20	70	0	0	0	20	110	0	150																		
9	18	63	300	0	0	140	0	20	0	70	70	0	70																		

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ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN CHATTAHOOCHEE RIVER

STATION LOCATION CHATTAHOOCHEE RIVER AT ATLANTA, GEORGIA

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
9	26	62	10	10	5210	134	74	60	-	-	-	-	-	-	-	-	-	-	-
10	31	62	11	20	5130	144	60	84	-	-	-	-	-	-	-	-	-	-	-
10	31	62		*	10340	139	67	72	2	16	21	2	3	15	1	7	5	1	15
12	17	62	1	21	5160	256	102	154	7	26	24	1	2	19	2	8	9	2	26
2	11	63	3	18	5050	202	55	147	-	-	-	-	-	-	-	-	-	-	-
4	18	63	6	24	3650	148	58	90	2	16	19	3	2	13	1	6	5	1	9
7	23	63	8	15	5000	178	104	74	7	29	20	1	2	16	1	10	16	1	21
9	5	63	9	24	5000	187	82	105	7	27	17	1	1	14	1	7	8	1	15

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE GEORGIA
MAJOR BASIN SOUTHEAST
MINOR BASIN CHATTAHOOCHEE RIVER
STATION LOCATION CHATTAHOOCHEE RIVER AT ATLANTA, GEORGIA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	3	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7300
10	10	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	600
10	17	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7400
10	31	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1400
11	7	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1300
11	14	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3200
11	21	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3600
11	30	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1400
12	5	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400
12	12	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	380
12	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2500
1	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	470
1	9	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2000
1	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*22
1	23	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
1	30	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350
2	6	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38000
2	13	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3700
2	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3900
2	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800
3	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3200
3	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3000
4	17	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2900
4	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2300
5	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	180
6	5	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	160
6	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400
7	3	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	200
7	10	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2000
7	17	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
7	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6300
7	31	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4000
8	7	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000
8	14	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2500
8	21	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5000
8	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2400
9	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
9	11	63	-	-	-	-	-	-	-	-	3	14	14	0	*25	1	•0	40	4000
9	18	63	-	-	-	-	-	-	-	-	3	14	14	5	*25	2	•0	46	9500
9	25	63	-	-	-	-	-	-	-	-	4	16	14	5	*25	2	•0	32	3000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Atlanta, Georgia
Operated by U.S. Geological Survey

STATE Georgia

MAJOR BASIN Southeast

MINOR BASIN Chattahoochee River

STATION LOCATION Chattahoochee River at Atlanta, Georgia

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	2.000	4.040	1.120	1.380	2.330	1.430	1.420	6.800	4.760	3.410	1.700	1.040
2	2.730	3.990	.910	1.350	2.190	1.420	2.020	5.310	1.030	5.440	1.630	1.500
3	5.540	3.080	1.050	1.220	3.150	.946	2.060	4.310	1.610	5.840	1.080	2.950
4	4.300	1.550	1.130	1.160	2.890	1.090	2.090	7.720	2.340	5.840	.870	3.020
5	3.060	2.730	1.150	1.040	2.680	1.340	2.010	8.360	2.190	5.780	1.310	3.030
6	1.800	4.740	1.130	.854	2.500	10.600	1.760	8.850	2.220	5.020	2.500	3.000
7	1.380	5.540	1.270	.973	2.480	4.280	1.210	8.780	2.290	1.300	3.540	1.900
8	1.440	5.300	1.090	1.070	2.410	3.060	2.200	8.780	1.290	2.160	2.110	.878
9	2.070	5.820	.886	1.130	2.150	1.630	4.730	8.830	.986	2.900	1.990	1.000
10	2.490	5.940	1.030	1.230	1.800	1.170	5.460	6.980	1.350	3.270	1.340	1.670
11	2.550	5.620	1.130	1.610	2.230	1.260	5.330	5.300	1.370	4.760	.870	1.700
12	2.450	3.190	1.130	2.780	2.680	4.620	5.260	1.070	1.410	5.650	1.750	1.770
13	1.740	5.660	1.130	1.470	2.540	11.600	3.900	1.430	1.480	4.860	4.040	1.790
14	.894	2.820	1.050	1.370	2.510	4.560	1.170	1.750	1.420	1.200	4.910	1.190
15	1.060	4.940	.991	1.300	2.370	2.650	1.400	2.960	1.230	2.190	5.070	.894
16	2.020	6.240	.902	1.270	2.150	1.850	2.680	4.040	1.240	4.390	4.850	.937
17	2.020	5.740	1.120	1.280	1.810	1.300	2.730	4.060	2.500	5.340	3.830	1.140
18	2.090	1.380	1.130	2.110	2.000	1.510	2.740	2.740	2.390	5.300	1.210	1.340
19	2.070	2.760	1.290	1.990	3.040	1.510	2.680	.973	2.820	5.260	1.770	1.310
20	1.600	5.360	1.140	2.770	2.980	1.830	1.910	1.500	3.820	4.600	4.510	1.210
21	.946	10.000	1.090	2.080	2.710	1.710	1.250	2.760	5.620	1.510	5.070	1.040
22	1.300	11.700	1.140	1.550	2.410	1.210	1.650	2.550	4.290	2.370	4.980	.854
23	2.510	7.000	.830	1.500	2.200	1.130	4.460	2.530	3.260	4.460	4.900	.955
24	2.310	5.310	.937	1.450	1.880	.946	4.480	2.530	2.760	5.460	3.680	1.130
25	2.410	1.280	1.690	1.170	2.130	1.180	4.520	1.580	2.920	5.470	1.100	1.570
26	2.390	1.310	2.240	1.090	2.410	1.590	4.520	1.030	3.250	1.330	1.750	1.420
27	2.230	1.060	1.510	1.140	2.260	1.390	3.250	1.820	3.900	1.020	4.170	1.530
28	1.370	1.380	1.240	1.000	1.680	1.250	1.530	3.110	4.620	.973	4.240	3.440
29	2.550	1.250	1.660	1.120		1.110	6.700	2.250	4.090	1.050	4.300	2.190
30	3.880	1.200	1.590	1.370		1.530	14.000	2.910	4.580	1.570	4.200	2.670
31	4.210		1.240	1.370		.910		5.520		1.780	3.320	

ESCAMBIA RIVER AT CENTURY, FLORIDA

This station is located just below the Florida-Alabama State line. Samples are collected from State Highway 4 Bridge two miles east of Century.

The Alabama municipalities of Brewton, East Brewton and Flomaton which have a total sewered population of about 6,000 discharge untreated wastes into the Escambia River or a tributary within 13 miles upstream of the station. Upstream industrial discharges within this distance include wood preservative wastes; Kraft paper mill wastes with a BOD population equivalent of 81,000; and brine wastes totaling 26,000 lbs./ day of chlorides.

The main uses of the Escambia River downstream from the station in the State of Florida are recreation and industrial cooling water.

An unusually high concentration of coccoid blue-green algae (26,000/ml) occurred at this station in the sample of September 16, 1963. These high algal counts may be related to high phosphate concentration (> 1 mg/l) occurring during August and September 1963.

Station Location: Escambia River at Century, Florida

Major Basin: Southeast

Minor Basin: Perdido-Escambia Rivers

Station at: 30°57' Latitude 87°17' Longitude

Miles above mouth: 49

Activation Date: August 1960

Sampled by: Florida State Board of Health

Field Analysis by: Florida State Board of Health

Other Cooperating Agencies: None

Hydrologic Data:

Nearest pertinent gaging station: Near Century, Florida

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 3,817 square miles

Period of record: 1934 to present

Average discharge in record period: 6,151 cfs.

Maximum discharge in record period: 77,200 cfs.

Minimum discharge in record period: 600 cfs.

Remarks: Flows affected by upstream power plant operations.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	–	.05
	Na	–	7.2
	K	–	.8
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	–	40
	Cd	–	*1
	As	–	*12
	B	–	20
	P	–	77
	Fe	–	177
	Mo	–	*3
	Mn	–	*1
	Al	–	53
	Be	–	*.03
	Cu	–	12
	Ag	–	.3
	Ni	–	*1
	Co	–	*1
	Pb	–	*3
	Cr	–	*3
	V	–	*6
	Ba	–	17
	Sr	–	60

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	–	–	April to June	1.4	.3
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE FLORIDA

MAJOR BASIN SOUTHEAST

MINOR BASIN PERDIDO-ESCAMBIA RIVERS

STATION LOCATION ESCAMBIA RIVER AT CENTURY, FLORIDA 62

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY				
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA		
MO	DAY	YR	MO DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±	
3	28	63	4 18*	2	1	1	1	3 1	14	6	20	7	34	9						
4	30	63	5 22*	0	1	0	1	0 1	18	6	22	7	40	9						
5	28	63	6 19*	0	0	0	0	0 0	16	6	15	6	31	8						
6	25	63	7 24*	0	1	0	1	0 1	17	6	24	7	41	9						
7	29	63	9 9*	0	1	0	1	0 1	9	3	20	3	29	4						
8	28	63	9 25*	1	1	0	1	1 1	11	11	9	11	20	16						
9	27	63	10 31*	1	1	0	1	1 1	7	6	5	6	12	8						

PLANKTON POPULATION

STATE FLORIDA

MAJOR BASIN SOUTHEAST

MINOR BASIN PERDIDO-ESCAMBIA RIVERS

STATION LOCATION ESCAMBIA RIVER AT CENTURY, FLORIDA 062

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																							
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS														CRUSTACEA										
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)						NEMATODES (Identifiable) Number per liter	OTHER ABIBAL FORMS (Number per liter)
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
3	18	63	51	11	64	10	92	7	69	7	65			1											0								
4	15	63	32	10	57	7	43	6	71	5	72			0											0							0	0
4	30	63	32	16	57	9	2	6	43	4	65			0											0							0	0
5	14	63	32	28	57	6	95	5	33	4	57																					0	0
5	28	63	32	33	65	5	33	4	43	4	54																						
6	12	63	32	18	64	11	70	10	43	8	53																						
6	25	63	70	10	64	10	1	9	2	8	63																						
7	10	63																															
7	29	63																															
8	13	63																															
8	28	63																															
9	13	63																															

PLANKTON POPULATION

STATE FLORIDA
MAJOR BASIN SOUTHEAST
MINOR BASIN PERDIDO-ESCAMBIA RIVERS
STATION LOCATION ESCAMBIA RIVER AT
CENTURY, FLORIDA 62

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
3	18	63	500	0	20	40	0	20	260	0	110	20	110	65	1																		
4	15	63	200	0	0	90	0	80	0	50	30	0	80																				
4	30	63	500	10	60	170	0	130	10	10	100	10	70																				
5	14	63	200	0	0	20	0	0	0	40	150	0	130																				
5	28	63	500	0	30	130	0	70	10	70	150	10	60																				
6	12	63	900	0	20	130	0	0	60	80	630	0	130																				
6	25	63	100	0	0	20	0	20	0	0	70	0	20																				
7	10	63	00	0	0	0	0	0	0	0	0	0	20																				
7	29	63	200	0	0	60	0	0	0	60	40	0	120																				
8	13	63	1200	200	0	700	0	40	0	20	240	20	40	38	1	1	1	25	1														
8	28	63	1900	1310	0	370	0	20	0	110	90	20	110	3	4	38	1																
9	13	63	26000	25650	0	160	0	0	0	20	140	20	90	4	8																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE FLORIDA
MAJOR BASIN SOUTHEAST
MINOR BASIN PERDIDO-ESCAMBIA RIVERS
STATION LOCATION ESCAMBIA RIVER AT CENTURY, FLORIDA

62

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
5	6	63	5	13	5000#	94	38	56	2	8	13	2	1	9	1	5	4	1	5

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE FLORIDA

MAJOR BASIN SOUTHEAST

MINOR BASIN PERDIDO-ESCAMBIA RIVERS

STATION LOCATION ESCAMBIA RIVER AT CENTURY, FLORIDA 62

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
2	15	63	17.0	8.6	6.7	1.9	30	-	-	.3	8	27	28	30	75	-	-	92	-
3	1	63	19.0	8.3	6.8	1.6	28	-	-	.2	9	26	30	25	60	-	-	88	-
3	15	63	20.0	8.2	6.7	2.1	34	-	-	.4	11	29	26	35	80	-	-	79	-
3	29	63	22.0	8.0	6.7	2.2	36	-	-	.3	8	27	34	30	70	-	-	87	-
4	15	63	21.0	6.7	6.6	2.4	37	-	-	.4	11	28	33	40	50	6	-	92	7000
4	30	63	24.0	5.3	6.7	3.1	46	-	-	.3	10	31	37	50	45	9	-	103	-
5	17	63	28.0	6.7	6.7	1.2	47	-	-	.1	12	34	35	50	40	7	.1	97	-
5	31	63	29.0	5.4	6.8	1.6	59	-	-	.2	17	27	39	60	35	6	.1	123	100000
6	14	63	30.0	5.9	6.8	1.4	77	-	-	.1	26	31	39	60	35	6	.1	123	-
6	28	63	29.0	6.4	6.9	1.3	29	-	-	.1	16	25	30	20	55	4	.1	78	13000
7	8	63	30.0	6.6	6.7	2.2	37	-	-	.4	12	27	31	50	60	-	.4	92	-
7	22	63	29.0	6.4	6.4	2.0	34	-	-	.5	7	28	30	40	35	-	.7	70	5800
7	31	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60000
8	1	63	29.0	6.7	6.5	1.2	25	-	-	.3	8	23	26	40	50	-	1.7	80	-
8	14	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31000
8	15	63	28.0	6.0	6.6	2.7	27	-	-	.1	6	20	26	30	55	-	1.2	140	-
8	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*5
8	30	63	29.0	6.1	6.7	2.4	25	-	-	.3	9	25	29	40	65	-	.3	121	-
9	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	77000
9	16	63	17.0	5.9	6.8	2.9	31	-	-	.9	8	29	27	60	75	-	.9	143	-
9	30	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2100

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Century, Florida
Operated by U.S. Geological Survey

STATE Florida

MAJOR BASIN Southeast

MINOR BASIN Perdido-Escambia Rivers

STATION LOCATION Escambia River at Century, Florida

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	1.470	1.150	2.450	5.880	7.720	6.310	3.480	2.220	1.560	2.700	2.400	1.530
2	1.800	1.170	2.540	5.190	7.260	6.130	3.360	2.180	1.220	2.520	2.360	1.480
3	2.480	1.200	2.380	4.700	7.090	5.960	3.380	1.900	1.110	2.260	2.510	1.430
4	2.750	1.160	2.240	4.230	7.080	5.620	3.320	1.750	1.080	2.070	1.960	1.240
5	2.670	1.150	2.190	3.650	6.970	5.520	3.290	1.710	1.020	2.130	1.830	1.120
6	2.020	1.190	2.110	3.400	6.700	6.470	3.190	1.680	1.010	2.080	1.350	1.090
7	1.740	1.220	2.110	3.380	6.440	8.510	3.860	1.700	.985	1.670	1.250	1.120
8	1.690	1.250	2.160	3.360	6.210	9.430	4.680	1.610	.990	1.820	1.230	1.050
9	1.720	1.500	2.150	3.260	5.960	9.520	4.900	1.530	.960	2.840	1.210	.970
10	1.800	1.810	2.200	3.070	5.760	9.220	4.700	1.490	.960	4.050	1.520	1.000
11	1.730	2.060	2.090	3.010	5.760	8.590	4.460	1.450	1.260	3.430	1.440	.990
12	1.480	1.910	2.030	5.120	6.820	8.370	4.200	1.460	1.080	2.350	1.590	.935
13	1.480	1.740	2.000	7.510	8.170	8.220	3.890	1.450	.930	1.670	2.440	.960
14	1.540	1.920	1.970	8.370	7.680	7.430	3.460	1.520	.855	1.640	2.610	1.040
15	1.520	1.910	2.110	7.920	7.160	7.020	3.180	1.520	.814	1.820	4.110	1.220
16	1.520	1.720	1.890	7.190	6.8[illegible]	[illegible]	2.760	1.570	.830	1.730	4.380	1.180
17	1.360	1.580	1.680	6.790	6.190	7.860	2.750	1.520	.910	1.630	3.730	1.140
18	1.300	1.610	1.660	6.390	5.810	7.130	2.660	1.380	1.070	1.940	3.340	1.060
19	1.260	1.540	1.740	6.320	6.880	6.310	2.570	1.350	1.390	2.150	3.160	.985
20	1.230	1.540	1.760	11.400	8.780	5.630	2.400	1.450	2.200	1.990	2.700	.955
21	1.240	2.360	1.720	20.200	8.890	5.230	2.240	1.340	3.010	1.950	3.080	.950
22	1.320	4.980	1.820	24.700	8.540	4.940	2.120	1.290	2.980	2.020	3.270	.950
23	1.480	6.030	1.980	24.600	7.730	4.690	2.070	1.470	4.070	2.280	2.620	.930
24	1.470	5.370	2.120	22.100	7.370	4.620	2.050	1.630	4.120	2.410	2.170	.870
25	1.350	4.610	3.100	20.400	7.910	4.490	1.920	1.530	3.560	3.380	1.970	.910
26	1.260	4.260	5.180	19.600	7.790	4.360	1.790	1.350	3.410	3.520	1.700	1.020
27	1.260	4.310	5.580	19.200	7.300	4.270	1.730	1.260	2.930	4.220	1.580	1.070
28	1.240	4.220	4.960	18.300	6.720	4.240	1.700	1.290	2.730	4.020	1.470	1.370
29	1.160	3.600	5.700	15.900		4.190	1.730	1.440	3.060	3.200	1.410	1.970
30	1.130	2.880	7.350	11.900		4.020	2.000	1.480	2.860	2.660	1.510	2.730
31	1.160		7.020	8.890		3.740		1.720		2.740	1.730	

ROANOKE RIVER AT JOHN H. KERR RESERVOIR AND DAM, VIRGINIA

This sampling point is the turbine intake of the Corps of Engineers John H. Kerr Dam which, depending on the reservoir elevation, is from 40 to 80 feet below the surface of Kerr Reservoir. During periods of summer stratification in the reservoir, the dissolved oxygen levels are reduced.

Station Location: Roanoke River at John H. Kerr Reservoir & Dam, Virginia

Major Basin: Southeast

Minor Basin: Roanoke River

Station at: 36°35'56" Latitude 78°18'06" Longitude

Miles above mouth: 178

Activation Date: June 19, 1961

Sampled by: U.S. Army Corps of Engineers

Field Analysis by: U.S. Army Corps of Engineers
U.S. Public Health Service

Other Cooperating Agencies: Virginia State Water Control Board

Hydrologic Data:

Nearest pertinent gaging station: At Buggs Island, Virginia

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 7,780 square miles

Period of record: 1921-23, 1947 to present

Average discharge in record period: 7,686 cfs.

Maximum discharge in record period: 76,000 cfs.

Minimum discharge in record period: 99 cfs.

Remarks: Flows affected by operations of John H. Kerr Dam and Philpott Dam on Smith River. Average discharge adjusted for storage.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-4-63	0.04
3-11-63	0.08
3-18-63	<0.05
3-25-63	0.02
4-1-63	0.04
4-8-63	0.04
4-15-63	0.02
4-22-63	0.02
5-20-63	0.04

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.07	.10
	Na	11	5.0
	K	2.3	1.3
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	12	4
	Cd	*1	*2
	As	*7	*10
	B	21	16
	P	25	*3
	Fe	148	182
	Mo	3	*3
	Mn	.4	1.8
	Al	–	260
	Be	*.02	*.01
	Cu	10	13
	Ag	*.1	*.1
	Ni	*1	*2
	Co	*1	*2
	Pb	*4	*2
	Cr	*1	*2
	V	*1	*3
	Ba	24	14
	Sr	30	15

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.2	.2	April to June	1.3	.2
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE VIRGINIA

MAJOR BASIN SOUTHEAST

MINOR BASIN ROANOKE RIVER

STATION LOCATION ROANOKE RIVER AT JOHN H KERR RESR & DAM, VIRGINIA 91

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY				
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA		
MO.	DAY	YR	MO. DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
10	1	62	10 23	0	0	0	0	0	0	7	5	12	5	19	7					
10	8	62	12 26	0	1	0	0	0	1	1	4	12	5	13	7					
10	15	62	11 20	-	-	-	-	-	-	4	5	9	6	13	8					
10	22	62	11 8	-	-	-	-	-	-	8	5	19	6	27	8					
10	29	62	11 26	-	-	-	-	-	-	4	5	6	5	10	7					
11	26	62	12 12*	0	1	0	1	0	1	7	6	19	6	26	9					
12	31	62	1 15*	0	1	0	0	0	1	8	6	18	7	26	9					
1	28	63	2 25*	0	1	0	1	0	1	11	4	13	4	24	6					
2	28	63	3 20*	1	1	0	0	1	1	27	7	13	6	40	9					
3	26	63	4 16*	1	1	0	1	1	1	35	8	23	6	58	10					
4	29	63	5 24*	2	1	0	0	2	1	30	7	18	6	48	9					
5	27	63	6 24*	1	1	0	0	1	1	12	3	14	3	26	4					
6	24	63	7 30*	0	1	1	1	1	1	7	6	15	6	22	8					
7	29	63	8 27*	1	1	0	1	1	1	11	6	13	6	24	8					
8	26	63	10 8*	1	1	0	0	1	1	4	5	14	6	18	8					
9	30	63	11 6*	1	1	0	0	1	1	2	6	10	6	12	8					

PLANKTON POPULATION

STATE VIRGINIA

MAJOR BASIN SOUTHEAST

MINOR BASIN ROANOKE RIVER

STATION LOCATION ROANOKE RIVER AT JOHN H KERR RESR & DAM, VIRGINIA 091

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identified/Number per ml.)	ROTIFERS												CRUSTACEA								NEMATODES (Identified/Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														GENERA AND COUNT LEVEL (See text for Codes)											GENERA AND COUNT LEVEL (See text for Codes)									
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT				NUMBER PER LITER	1ST GENUS	1ST COUNT LEVEL	2ND GENUS	2ND COUNT LEVEL	3RD GENUS	3RD COUNT LEVEL	4TH GENUS	4TH COUNT LEVEL	5TH GENUS	5TH COUNT LEVEL	NUMBER PER LITER	1ST GENUS	1ST COUNT LEVEL	2ND GENUS	2ND COUNT LEVEL	3RD GENUS	3RD COUNT LEVEL			
10	1	62	56	44	58	42	57	7	28	2	5			27	11	2	22	1	10	1					21	50	3	53	2			0	0
10	15	62	58	39	56	20	57	19	28	10	12			0											2							0	0
11	5	62	56	58	58	28	57	4	47	3	7			2											1							0	0
11	20	62	58	40	56	21	57	18	82	11	10	20		15	22	1	11	1							3							0	0
12	3	62	58	50	56	33	47	7	57	4	6	50		129	22	4	11	4	17	1					3	76	1					0	0
12	17	62	56	64	58	18	47	3	57	3	12			1											1							0	0
1	8	63	92	15	64	7	65	7	36	6	65			2											1							0	0
1	21	63	56	70	57	8	82	8	47	5	9			0											0							0	0
2	4	63	56	68	57	12	9	6	82	5	9			0											0							0	0
2	18	63	56	43	57	23	82	21	9	3	10			1											0							0	0
3	4	63	56	30	57	29	82	21	9	10	10			0											0							0	0
3	18	63	57	35	58	25	56	10	92	5	25			0											0							0	0
4	1	63	57	42	56	26	82	21	58	2	9			1											0							0	0
4	15	63	56	48	57	32	58	8	92	5	7			2											2							0	0
5	6	63	57	77	82	14	56	4	47	1	4			-											2							0	0
5	20	63	57	95	56	2	92	1	31	1	1			-											-							-	-
6	3	63	57	97	82	1	56	1	28	1				-											-							-	-
6	17	63	57	87	56	4	58	4	28	2	3			-											-							-	-
7	15	63	57	75	56	6	47	5	58	3	11			-											-							-	-
8	5	63												-											-							-	-
8	19	63												-											-							-	-
9	3	63												-											-							-	-
9	16	63												-											-							-	-

PLANKTON POPULATION

STATE VIRGINIA

MAJOR BASIN SOUTHEAST

MINOR BASIN ROANOKE RIVER

STATION LOCATION ROANOKE RIVER AT JOHN H KERR RESR & DAM, VIRGINIA 91

DATE OF SAMPLE			ALGAE (Number per milliliter)										MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS		INERT DIATOM SHELLS		1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	CREEP	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	800	0	40	0	0	0	0	550	210	0	40	68	2																		
10	15	62	200	0	0	0	0	0	0	170	40	40	40	69	1																		
11	5	62	400	0	60	0	0	0	0	250	120	0	0	69	1																		
11	20	62	200	0	0	20	0	0	0	180	30	120	0																				
12	3	62	200	0	0	0	0	0	20	200	0	470	20																				
12	17	62	300	0	0	20	0	0	0	240	60	180	140	69	1																		
1	8	63	00	0	20	0	0	0	0	30	0	50	0																				
1	21	63	100	0	20	0	0	0	0	110	0	30	20																				
2	4	63	100	0	0	0	0	20	0	80	0	0	0																				
2	18	63	500	0	0	40	0	20	240	180	40	20	40	60	1																		
3	4	63	200	0	0	0	0	0	30	180	0	20	0																				
3	18	63	200	0	0	0	0	40	70	70	20	90	40																				
4	1	63	300	0	0	30	0	0	140	70	10	10	0																				
4	15	63	600	0	0	0	0	20	0	510	40	200	40	69	2																		
5	6	63	900	0	0	0	0	0	0	880	20	180	0	69	3																		
5	20	63	1500	0	0	0	0	150	0	1320	40	640	20	69	4	65	1																
6	3	63	3300	0	0	20	0	200	0	3010	40	2050	0	69	5	65	1																
6	17	63	1200	0	0	0	0	150	0	1080	0	330	40	69	3	65	1																
7	15	63	500	0	0	20	0	40	0	330	90	310	20	69	2																		
8	5	63	200	0	0	20	0	0	0	170	40	120	20																				
8	19	63	100	0	0	0	0	0	0	40	20	20	0																				
9	3	63	200	40	0	0	0	0	0	130	20	70	20																				
9	16	63	700	340	0	70	0	0	0	230	20	70	0	3	2																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE VIRGINIA

MAJOR BASIN SOUTHEAST

MINOR BASIN ROANOKE RIVER

STATION LOCATION ROANOKE RIVER AT JOHN H KERR RESR & DAM, VIRGINIA 91

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	17	4970	215	63	152	1	16	18	2	1	14	1	8	6	1	13
11	5	62	11	20	4740	305	132	173	8	37	22	0	1	20	1	13	20	3	29
12	3	62	12	18	4750	341	133	206	15	39	23	1	0	21	1	20	17	1	18
1	8	63	1	23	4680	298	130	168	9	38	21	1	1	19	0	10	13	3	36
2	4	63	2	21	4000	327	123	204	9	38	26	1	2	23	0	11	12	3	24
3	4	63	3	19	4790	286	148	138	9	47	25	1	2	22	0	12	19	3	33
4	1	63	4	16	4570	252	103	149	6	30	22	1	2	18	1	9	10	1	25
5	6	63	5	21	4700	280	142	138	8	36	24	1	1	20	2	14	23	1	36
6	3	63	6	18	4450	311	157	154	9	47	22	2	1	17	2	14	18	1	46
7	1	63	7	19	4120	308	148	151	10	49	13	2	0	11	0	9	26	2	39
8	5	63	8	22	4760	270	136	134	2	51	20	1	1	18	0	20	15	1	27
9	3	63	9	20	4790	270	127	143	8	39	20	0	1	16	3	15	19	2	24

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE VIRGINIA

MAJOR BASIN SOUTHEAST

MINOR BASIN ROANOKE RIVER

STATION LOCATION ROANOKE RIVER AT JOHN H KERR RESR & DAM, VIRGINIA 91

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	18.8	6.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	16	62	20.5	8.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	29	62	16.0	8.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	13	62	-	-	7.7	-	-	-	-	-	8	32	36	5	*25	5	.0	65	-
11	20	62	-	-	7.7	-	-	-	-	-	7	38	32	0	*25	7	.0	68	-
11	26	62	-	-	7.6	-	-	-	-	-	5	34	28	5	*25	8	.0	60	-
12	3	62	-	-	8.0	-	-	-	-	-	31	36	60	5	*25	13	.0	150	-
12	10	62	-	-	7.9	-	-	-	-	-	8	40	28	10	*25	9	.0	90	-
12	17	62	-	-	7.9	-	-	-	-	-	7	12	44	10	*25	8	.0	63	-
12	26	62	-	-	7.6	-	-	-	-	-	9	40	56	-	*25	7	.0	52	-
12	31	62	-	-	7.6	-	-	-	-	-	7	30	44	-	*25	9	.0	80	-
1	8	63	-	-	7.9	-	-	-	-	-	45	24	20	-	*25	14	.0	130	-
1	14	63	-	-	7.6	-	-	-	-	-	5	32	32	-	*25	8	.0	60	-
1	21	63	-	-	7.4	-	-	-	-	-	6	32	44	-	*25	7	.0	55	-
1	28	63	-	-	7.5	-	-	-	-	-	5	36	52	-	*25	10	.0	60	-
2	4	63	-	-	7.8	-	-	-	-	-	5	34	48	15	*25	8	.0	69	-
2	15	63	-	-	7.5	-	-	-	-	-	4	32	36	5	*25	7	.0	60	-
2	18	63	-	-	7.4	-	-	-	-	-	6	24	32	5	*25	6	.0	65	-
2	25	63	-	-	7.7	-	-	-	-	-	6	32	36	10	*25	7	.0	60	-
3	4	63	-	-	8.1	-	-	-	-	-	6	32	36	10	*25	6	.0	80	-
3	11	63	-	-	8.0	-	-	-	-	-	4	36	44	5	*25	7	.0	60	-
3	18	63	-	-	6.9	-	-	-	-	-	3	24	32	20	*25	5	.0	50	-
3	26	63	-	-	7.3	-	-	-	-	-	4	24	36	20	50	7	.0	58	-
4	1	63	-	-	7.3	-	-	-	-	-	4	24	36	15	45	7	.1	53	-
4	8	63	-	-	8.1	-	-	-	-	-	6	24	32	10	70	7	.0	-	-
4	15	63	-	-	7.4	-	-	-	-	-	6	28	32	15	*25	8	.0	69	-
4	22	63	-	-	7.1	-	-	-	-	-	8	24	140	15	*25	6	.0	51	-
4	29	63	-	-	-	-	-	-	-	-	7	32	52	20	*25	12	.0	65	-
5	7	63	15.5	8.6	-	-	-	-	-	-	7	36	32	10	*25	8	.0	76	-
5	13	63	-	-	-	-	-	-	-	-	5	24	40	5	*25	6	.0	46	-
5	20	63	20.0	9.0	-	-	-	-	-	-	5	28	36	15	*25	8	.0	61	-
5	27	63	-	-	-	-	-	-	-	-	6	36	60	15	*25	9	.0	71	-
6	3	63	19.5	7.9	-	-	-	-	-	-	5	38	32	10	*25	9	.0	64	-
6	17	63	21.2	8.6	-	-	-	-	-	-	10	26	40	15	*25	7	.0	61	-
6	24	63	-	-	-	-	-	-	-	-	6	30	44	10	*25	9	.0	82	-
7	1	63	27.8	7.7	-	-	-	-	-	-	7	34	44	5	*25	8	.0	55	-
7	8	63	-	-	-	-	-	-	-	-	8	32	40	10	*25	7	.0	55	-
7	15	63	-	-	-	-	-	-	-	-	7	26	40	10	*25	11	.0	59	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE VIRGINIA

MAJOR BASIN SOUTHEAST

MINOR BASIN ROANOKE RIVER

STATION LOCATION ROANOKE RIVER AT JOHN H KERR RESR & DAM, VIRGINIA VI

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	22	63	-	-	-	-	-	-	-	-	7	30	36	5	*35	7	*0	52	-
7	29	63	-	-	-	-	-	-	-	-	6	28	36	5	*25	6	*0	60	-
8	5	63	-	-	-	-	-	-	-	-	7	30	30	5	*25	7	*0	40	-
8	12	63	-	-	-	-	-	-	-	-	7	28	38	5	*25	7	*0	34	-
8	19	63	-	-	-	-	-	-	-	-	9	28	40	5	*25	6	*0	38	-
8	26	63	-	-	-	-	-	-	-	-	6	32	36	5	*25	5	*0	60	-
9	3	63	-	-	-	-	-	-	-	-	7	34	34	0	*25	6	*0	57	-
9	9	63	-	-	-	-	-	-	-	-	6	34	32	0	*25	5	*0	64	-
9	16	63	-	-	-	-	-	-	-	-	6	36	34	0	*25	5	*0	64	-
9	23	63	19.5	5.8	-	-	-	-	-	-	6	34	32	0	*25	7	*0	79	-
9	30	63	-	-	-	-	-	-	-	-	7	36	32	0	*25	7	*0	78	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at John H. Kerr Reservoir & Dam, Virginia
Operated by U.S. Corps of Engineers, Wilmington District

STATE Virginia

MAJOR BASIN Southeast

MINOR BASIN Roanoke River

STATION LOCATION Roanoke River at
John H. Kerr Reservoir & Dam, Va.

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	7.520	4.680	2.030	3.100	14.700	10.600	23.300	8.200	1.150	6.650	4.540	.082
2	3.870	6.100	.130	6.190	6.560	.330	18.900	5.280	.090	4.370	2.320	2.110
3	4.980	.111	6.300	7.070	1.070	.173	18.000	7.680	11.600	3.350	.084	9.240
4	3.220	.110	9.270	7.230	15.000	7.830	16.400	.083	12.200	.082	.083	7.960
5	3.590	1.890	7.430	.930	15.800	8.740	12.900	.079	9.690	1.870	2.310	8.150
6	.085	8.210	7.330	.349	14.200	6.700	4.210	6.630	9.290	.077	4.100	4.400
7	.081	17.900	7.140	9.260	15.000	19.200	.105	7.300	7.940	.078	3.870	.084
8	4.510	14.800	1.990	8.930	13.400	18.000	7.960	8.640	.079	5.660	4.600	.085
9	3.930	7.240	.159	9.290	5.230	18.800	4.440	12.500	.081	2.100	6.150	7.070
10	4.620	3.660	9.230	9.260	.597	14.200	2.730	8.990	14.200	2.660	.083	6.200
11	4.670	.108	8.590	9.760	10.200	20.200	2.930	.079	4.860	3.620	.084	7.090
12	2.450	7.400	9.010	4.200	13.300	18.900	2.600	.104	4.700	3.840	2.950	8.810
13	6.320	9.610	8.880	.757	12.400	18.000	.105	2.650	5.950	.081	4.470	5.060
14	9.630	19.900	7.100	10.400	13.900	17.600	.107	4.210	6.300	.078	4.380	.086
15	18.700	11.400	1.450	14.900	13.800	18.200	2.750	5.080	.078	6.850	4.610	.087
16	18.000	7.040	.179	15.900	3.020	22.300	6.610	6.850	.079	9.170	4.970	3.350
17	6.220	2.440	6.850	17.300	1.060	5.600	5.410	6.540	5.050	6.320	.083	4.910
18	6.400	.108	7.540	17.000	7.060	17.800	4.690	.086	7.310	6.370	.083	5.410
19	7.650	7.350	7.360	7.350	4.200	18.300	5.850	.088	6.800	6.300	5.940	8.690
20	.091	8.380	13.800	.154	3.780	17.100	.359	7.770	5.600	.852	8.220	8.120
21	.089	6.520	19.600	16.200	3.800	16.400	.076	7.200	2.000	.085	4.070	3.820
22	8.100	1.640	16.000	15.700	4.000	17.200	4.420	7.500	.085	1.480	8.960	.088
23	5.920	6.660	2.680	16.000	.770	18.600	4.450	8.020	.084	2.190	4.000	4.670
24	3.890	2.600	18.600	16.400	.188	11.600	4.670	8.080	3.380	2.100	.083	5.360
25	5.080	.133	.654	16.700	5.170	22.200	3.410	.080	2.430	2.520	.081	4.560
26	1.750	19.000	10.700	9.230	5.200	20.300	5.200	.080	3.530	5.420	6.060	5.770
27	.111	19.200	9.300	2.290	4.990	19.100	.306	7.980	6.610	.083	4.680	6.480
28	.105	8.590	7.440	17.100	5.170	18.700	.088	8.050	5.510	.084	2.850	.507
29	2.840	9.240	3.090	16.800		19.800	7.530	8.320	2.340	5.590	7.770	.083
30	2.740	7.200	.195	15.300		18.700	8.240	3.000	.076	4.750	7.330	5.910
31	2.110		5.860	15.200		11.900		8.320		2.720	.083	

SAVANNAH RIVER AT PORT WENTWORTH, GEORGIA

Samples are collected from U.S. Highway 17 Bridge. This is near the head, but still within the tidal estuary. The city of Savannah discharges raw sewage from over 100,000 people downstream from the station.

There has been a significant reduction in coliform bacteria in samples taken at this station since the summer of 1962. The reason for this change has not yet been established.

	COLIFORM BACTERIA PER 100 ml.					
	Water year					
	1958	1959	1960	1961	1962	1963
Autumn	–	2,700	2,300	2,000	3,800	30
Winter	730	2,200	400	2,000	2,500	13
Spring	900	1,200	2,000	2,100	3,700	*
Summer	3,300	4,500	3,500	3,000	400	160

*Insufficient Data

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Station Location:	Savannah River at Port Wentworth, Georgia
Major Basin:	Southeast
Minor Basin:	Savannah River
Station at:	32°10' Latitude 81°09' Longitude
Miles above mouth:	22
Activation Date:	February 14, 1958
Sampled by:	U.S. Army Corps of Engineers
Field Analysis by:	Public Health Service
Other Cooperating Agencies:	Chatham County Health Department Georgia State Department of Public Health
Hydrologic Data:	
Nearest pertinent gaging station:	Near Clyo, Georgia
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	9,850 square miles
Period of record:	1929-1933; 1937 to present
Average discharge in record period:	11,360 cfs.

Maximum discharge in record period: 270,000 cfs.

Minimum discharge in record period: 1,950 cfs. (daily)

Remarks: Flows affected by operations of Burton, Clark Hill, Hartwell and Mathis Reservoirs.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.15	.15
	Na	8.0	5.9
	K	1.7	1.2
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	18	15
	Cd	*1	*2
	As	*6	10
	B	19	16
	P	330	40
	Fe	256	24
	Mo	*1	5
	Mn	2.1	1.5
	Al	–	5
	Be	*.02	*.03
	Cu	11	19
	Ag	.1	*.3
	Ni	*1	3
	Co	*1	1
	Pb	2	3
	Cr	*1	3
	V	*1	*5
	Ba	26	12
	Sr	43	18

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.5	.2	April to June	2.2	.6
January to March	2.4	.5	July to September	3.2	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
12/18/62 - 1/23/63	Dieldrin	

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

See page 21.

RADIOACTIVITY DETERMINATIONS

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT PORT WENTWORTH, GEORGIA

47

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	10	25	0	1	0	0	0	1	6	5	10	6	16	8						
10	8	62	11	16	-	-	-	-	-	-	4	5	3	5	7	7						
10	15	62	12	5	-	-	-	-	-	-	8	6	80	7	88	9						
11	13	62	12	3	-	-	-	-	-	-	7	4	27	5	34	6						
11	19	62	12	12	0	1	0	0	0	1	3	6	21	6	24	8						
11	26	62	12	31	-	-	-	-	-	-	12	3	26	3	38	4						
12	3	62	1	7	-	-	-	-	-	-	6	4	1	3	7	5						
12	10	62	1	3	-	-	-	-	-	-	8	6	19	6	27	8						
12	17	62	1	9	0	0	0	0	0	0	0	6	19	6	19	8						
12	26	62	1	14	-	-	-	-	-	-	13	3	25	3	38	4						
1	2	63	1	21	-	-	-	-	-	-	7	3	25	3	32	4						
1	7	63	1	23	-	-	-	-	-	-	11	6	17	6	28	8						
1	14	63	1	25	0	0	0	0	0	0	15	6	34	6	49	8						
1	21	63	1	30	-	-	-	-	-	-	26	13	70	16	96	21						
1	29	63	2	18	-	-	-	-	-	-	33	6	36	3	69	6						
2	4	63	2	18	-	-	-	-	-	-	43	5	59	4	102	6						
2	11	63	3	1	-	-	-	-	-	-	39	7	53	8	92	11						
2	18	63	3	4	1	1	0	1	1	1	25	3	30	3	55	4						
2	25	63	3	11	1	1	0	0	1	1	60	4	83	4	143	6						
3	4	63	3	22	-	-	-	-	-	-	14	6	27	6	41	8						
3	11	63	3	28	-	-	-	-	-	-	21	6	20	5	41	8						
3	18	63	4	1	1	1	0	1	1	1	20	3	27	3	47	4						
3	25	63	4	8	-	-	-	-	-	-	22	3	22	3	44	4						
4	1	63	4	16	-	-	-	-	-	-	12	6	20	6	32	8						
6	17	63	7	3	0	1	0	1	0	1	8	6	33	7	41	9						
6	24	63	7	17	-	-	-	-	-	-	58	8	77	8	135	11						
7	1	63	7	17	-	-	-	-	-	-	27	6	84	8	111	10						
7	8	63	7	23	-	-	-	-	-	-	17	5	32	6	49	8						
7	15	63	7	31	-	-	-	-	-	-	22	6	24	6	46	8						
7	22	63	8	12	0	1	0	0	0	1	10	3	27	3	37	4						
7	29	63	8	12	-	-	-	-	-	-	46	7	28	3	74	8						
8	5	63	8	19	-	-	-	-	-	-	16	3	24	3	40	4						
8	12	63	8	23	-	-	-	-	-	-	27	7	19	6	46	9						
8	19	63	9	16	0	0	0	1	0	1	3	3	20	3	23	4						
8	26	63	9	16	-	-	-	-	-	-	5	3	21	3	26	4						
9	3	63	9	17	-	-	-	-	-	-	2	5	20	7	22	9						
9	9	63	10	1	-	-	-	-	-	-	3	3	18	5	21	6						
9	16	63	10	2	1	1	0	1	1	1	2	5	13	6	15	8						
9	23	63	10	8	0	0	0	0	0	0	7	6	3	6	10	8						
9	30	63	10	14	-	-	-	-	-	-	4	3	25	4	29	5						

PLANKTON POPULATION

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT PORT WENTWORTH, GEORGIA 047

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																											
			1ST		2ND		3RD		4TH				PROTOZOA (Ideal/cubic) Number per ml.	ROTIFERS																CRUSTACEA								NEMATODES (Ideal/cubic) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)									
															1ST		2ND		3RD		4TH		5TH						1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
10	1	62	56	23	65	14	57	8	71	4	51		-	0											0									0	0
11	5	62	56	20	57	12	71	11	20	9	48		-	0											0									0	0
11	19	62	56	20	97	18	57	17	29	9	36		-	0											0									0	0
12	3	62	56	24	18	15	43	7	29	7	47		0	1											0									0	0
12	17	62	56	29	97	11	57	6	82	6	48		-	0											0									0	0
1	7	63	56	26	57	20	22	7	82	4	43	0	0	1											0									0	0
1	21	63	56	32	27	9	57	9	28	8	42	0	-	1											0									0	0
2	4	63	57	18	71	10	56	8	72	8	56	-	-	0											0									0	0
2	18	63	56	26	57	20	82	12	58	3	39	-	-	0											0									0	0
3	20	63	56	44	57	22	92	6	58	6	22	0	-	0											0									0	0
4	1	63	56	19	92	11	57	9	43	5	56	-	0	1											2									0	0
6	17	63	57	22	82	20	56	11	58	10	37	-	-	-											-									-	-
7	1	63	57	17	56	7	82	7	70	7	62	0	-	-											-									-	-
7	15	63										-	-	-											-									-	-
8	5	63	57	19	56	17	58	14	71	11	39	-	-	-											-									-	-
8	19	63	57	21	56	17	58	9	18	5	48	-	-	-											-									-	-
9	3	63	65	15	57	13	56	12	22	5	55	-	-	-											-									-	-
9	16	63										-	-	-											-									-	-
9	30	63	56	13	65	10	57	9	58	7	61	-	-	-											-									-	-

PLANKTON POPULATION

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT PORT WENTWORTH, GEORGIA 47

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	300	0	20	110	0	0	0	0	210	300	720																		
11	5	62	100	0	0	0	40	0	0	40	40	0	0																		
11	19	62	200	0	20	30	0	20	0	90	50	50	110																		
12	3	62	300	0	0	20	0	0	20	150	110	90	320																		
12	17	62	100	0	0	0	0	0	0	80	30	30	20																		
1	7	63	400	0	40	20	0	130	0	130	70	40	70																		
1	21	63	200	0	0	0	0	20	0	140	90	30	90																		
2	4	63	100	0	0	0	0	20	0	50	50	60	30																		
2	18	63	600	20	20	20	0	70	90	240	90	70	90	69	1																
3	20	63	400	0	20	0	0	0	150	150	40	20	150	63	1	69	1														
4	1	63	300	0	70	20	0	40	0	70	110	0	150																		
6	17	63	900	110	20	200	0	0	150	220	200	70	20	69	1																
7	1	63	100	0	0	20	0	0	0	70	20	20	20																		
7	15	63	200	0	0	100	0	0	0	60	0	0	0																		
8	5	63	700	0	0	260	0	70	0	70	260	20	70																		
8	19	63	500	20	0	240	0	40	0	110	90	130	110																		
9	3	63	500	20	0	260	0	40	0	20	170	20	150	25	1																
9	16	63	600	0	0	340	0	50	0	20	160	0	110																		
9	30	63	200	0	0	110	0	0	0	50	90	20	0																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT PORT WENTWORTH, GEORGIA 47

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	CHLOROFORM EXTRACTABLES NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	8	4280	181	77	104	2	22	15	2	1	11	1	9	9	1	19
12	18	62	1	21	11360	131	39	92	2	10	12	1	1	10	0	5	4	1	5
6	17	63	6	26	3470	215	79	136	2	20	22	3	2	16	1	12	8	1	14
7	8	63	8	28	5370*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	30	63	10	10	4320	219	60	159	4	15	14	1	1	11	1	10	6	1	10

* SAMPLE PERIOD EXCEEDED LIMIT

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE GEORGIA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT PORT WENTWORTH, GEORGIA 47

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (cobalt units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9400
10	8	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110
10	15	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12000
11	8	62	14.7	8.9	6.7	.7	-	-	-	-	10	20	15	10	27	5	-	46	*13
11	19	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*50
11	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
12	3	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
12	10	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
12	17	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
12	21	62	10.3	10.3	6.8	1.2	-	-	-	-	10	19	14	35	104	5	-	55	-
12	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500
1	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
1	7	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
1	14	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
1	22	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
1	25	63	7.8	9.8	6.2	1.7	-	-	-	-	6	27	15	15	12	5	-	52	-
1	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
2	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
2	11	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
2	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
2	21	63	10.3	9.9	6.4	1.6	-	-	-	-	10	14	14	25	36	7	-	40	-
2	25	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*13
3	22	63	14.7	7.3	6.5	1.2	-	-	-	-	3	16	14	55	29	6	-	42	-
4	18	63	17.5	7.9	6.7	1.7	-	-	-	-	6	20	18	30	33	9	-	71	-
5	16	63	20.3	6.2	6.1	1.2	-	-	-	-	5	14	13	40	39	12	-	66	-
6	13	63	24.5	6.4	6.7	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-
6	17	63	29.0	-	6.9	-	-	-	-	-	11	22	44	10	*25	4	.0	49	-
6	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
6	24	63	24.0	-	6.0	-	-	-	-	-	6	16	32	70	*25	5	.0	64	430
7	1	63	25.5	-	6.1	-	-	-	-	-	11	10	40	200	*25	7	.0	81	50
7	9	63	24.0	-	6.9	-	-	-	-	-	6	20	48	50	*25	14	.0	67	200
7	15	62	24.0	-	6.4	-	-	-	-	-	5	20	24	20	*25	5	.0	49	500
7	22	63	26.5	-	6.7	-	-	-	-	-	7	42	44	35	*25	4	.0	53	1500
7	29	63	27.5	6.3	6.7	.7	-	-	-	-	8	24	40	15	*25	5	.0	54	*13
8	5	63	28.0	5.5	6.8	1.4	-	-	-	-	8	18	24	20	*25	6	.0	40	10
8	12	63	28.5	-	6.7	.8	-	-	-	-	10	18	26	20	*25	6	.0	44	600
8	19	63	27.8	-	6.8	-	-	-	-	-	7	20	30	10	*25	6	.0	59	160
8	26	63	27.0	-	6.7	-	-	-	-	-	14	18	24	15	*25	6	.0	69	180

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE GEORGIA
MAJOR BASIN SOUTHEAST
MINOR BASIN SAVANNAH RIVER
STATION LOCATION SAVANNAH RIVER AT PORT WENTWORTH, GEORGIA 47

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
9	3	63	27.0	–	6.7	–	–	–	–	–	7	24	20	15	*25	6	.0	64	150
9	9	63	25.0	7.2	6.7	.9	–	–	–	–	7	20	22	15	*25	4	.0	46	30
9	16	63	–	–	–	–	–	–	–	–	5	22	26	10	*25	5	.0	60	–
9	23	63	–	–	–	–	–	–	–	–	6	24	18	5	*25	5	.0	50	–
9	30	63	–	–	–	–	–	–	–	–	31	22	28	10	*25	9	.0	125	50

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Clyo, Georgia
Operated by U.S. Geological Survey

STATE Georgia

MAJOR BASIN Southeast

MINOR BASIN Savannah River

STATION LOCATION Savannah River at Port Wentworth, Georgia

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	9.480	7.160	7.930	8.860	23.200	13.700	29.200	8.260	10.900	18.600	9.900	8.860
2	8.740	7.060	8.150	8.980	22.800	13.900	28.200	9.480	12.000	19.100	11.400	8.980
3	8.150	7.060	8.260	8.860	21.600	14.100	27.200	11.400	12.900	19.700	12.200	8.500
4	8.260	7.160	8.040	8.740	20.900	13.500	26.700	12.700	13.300	20.300	12.700	8.150
5	8.860	7.270	7.820	8.620	20.600	12.200	25.200	13.700	12.900	20.900	12.900	8.150
6	9.620	7.060	7.710	8.860	20.600	10.900	23.700	14.300	12.200	21.200	11.900	8.500
7	10.300	6.960	7.710	8.860	20.300	10.600	22.000	15.100	12.000	21.600	9.900	8.980
8	10.200	7.060	7.930	8.500	19.400	11.400	20.600	15.900	11.900	21.600	9.340	9.100
9	9.480	7.160	8.040	8.150	18.800	12.200	19.700	16.600	12.000	21.200	10.500	9.100
10	8.860	7.270	8.150	8.150	18.400	12.900	18.600	17.600	11.900	21.200	10.900	8.500
11	8.260	7.710	7.930	8.150	17.600	13.700	17.400	18.600	10.300	21.200	10.600	8.150
12	8.040	8.380	7.820	8.040	15.900	14.300	15.500	19.700	8.620	21.200	9.760	8.500
13	7.930	8.500	7.710	8.380	13.700	14.900	13.100	20.600	7.820	21.200	8.500	9.220
14	8.040	8.260	7.710	8.860	13.100	15.300	11.500	21.600	7.600	20.900	7.710	9.620
15	7.930	7.930	7.710	8.620	13.700	15.300	10.200	22.400	7.380	20.900	7.490	9.760
16	7.710	7.600	8.040	8.260	14.100	15.500	9.620	22.800	7.270	20.600	7.820	9.620
17	7.600	7.600	8.040	8.040	14.300	15.900	9.220	23.200	7.490	20.600	8.500	9.100
18	7.380	7.820	7.710	8.040	13.700	16.400	8.860	22.800	7.600	20.300	8.980	8.980
19	7.380	8.040	7.710	8.380	12.200	16.800	9.100	22.400	8.980	18.800	8.740	9.220
20	7.380	7.710	7.710	9.480	10.500	17.600	9.220	21.200	10.300	16.100	8.040	9.620
21	7.270	7.490	7.600	11.200	10.600	18.400	9.480	20.900	11.400	13.100	7.820	9.760
22	7.380	7.710	7.600	12.900	11.900	19.100	9.340	20.300	12.000	10.900	8.260	10.000
23	7.160	7.820	7.710	14.700	12.900	20.300	8.740	19.100	12.300	9.760	9.340	9.620
24	7.160	8.260	7.820	15.700	14.100	21.200	8.260	17.800	12.700	9.100	10.200	8.980
25	7.160	8.740	7.820	16.800	14.900	22.000	8.040	16.400	1.310	8.740	10.300	8.500
26	7.160	8.740	7.710	17.600	14.700	22.400	7.820	15.300	14.100	8.740	9.760	8.380
27	7.160	8.500	7.600	19.100	13.900	23.200	8.040	13.900	14.900	8.980	9.100	8.260
28	7.270	8.150	7.710	20.300	13.500	24.700	8.260	11.400	15.700	9.340	8.860	8.260
29	7.270	7.930	7.820	21.200		27.200	8.150	9.220	16.800	9.340	8.740	8.500
30	7.160	7.930	8.260	22.800		28.700	8.040	8.620	17.800	8.860	8.500	9.100
31	7.160		8.620	23.700		29.200		9.480		8.620	8.380	

SAVANNAH RIVER AT NORTH AUGUSTA, SOUTH CAROLINA

This sampling point is located at the intake of the North Augusta, South Carolina water treatment plant approximately 20 miles downstream from Clark Hill Dam and Reservoir.

The cities of Augusta, Georgia and North Augusta, South Carolina (combined population served 152,000) utilize Savannah River water for drinking purposes, and discharge wastes (both industrial and municipal) approximately two miles below the sampling station.

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/88-494 O - 84 - 8

Station Location:	Savannah River at North Augusta, South Carolina
Major Basin:	Southeast
Minor Basin:	Savannah River
Station at:	33°30' Latitude 82°00' Longitude
Miles above mouth:	202
Activation Date:	February 3, 1958
Sampled by:	North Augusta Water Department
Field Analysis by:	North Augusta Water Department
Other Cooperating Agencies:	South Carolina State Department of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Augusta, Georgia
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	7,508 square miles
Period of record:	1883-91; 1896-1906; 1925 to present
Average discharge in record period:	10,130 cfs.

Maximum discharge in record period: 350,000 cfs.

Minimum discharge in record period: 648 cfs.

Remarks: Flows affected by operations of Burton, Clark Hill, Hartwell and Mathis Reservoirs.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.15	.05
	Na	5.0	4.0
	K	2.2	1.2
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	66	14
	Cd	*1	*2
	As	*6	*10
	B	18	30
	P	99	*15
	Fe	243	506
	Mo	*1	*10
	Mn	1.4	3.9
	Al	—	621
	Be	*.02	*.02
	Cu	37	41
	Ag	*.1	*.2
	Ni	*1	*1
	Co	*1	*1
	Pb	*2	*2
	Cr	*1	*2
	V	*1	*2
	Ba	19	13
	Sr	30	19

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.6	.2	April to June	-	-
January to March	-	-	July to September	2.1	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
10/1 - 10/15/62	Dieldrin	
11/5 - 11/19/62	Dieldrin	
12/9 - 12/16/62	Dieldrin	
1/11 - 1/23/63	Dieldrin	
8/24 - 9/ 3/63	Dieldrin	0.010
8/24 - 9/ 3/63	DDD	0.003

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE SOUTH CAROLINA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT NORTH AUGUSTA, SOUTH CAROLINA 4c

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO	DAY	pc/g	±	pc/g	±
10	1	62	10	24	-	-	-	-	-	-	0	6	11	5	11	8						
10	9	62	11	30	-	-	-	-	-	-	7	5	9	5	16	7						
10	15	62	12	17	0	0	0	0	0	0	0	6	0	6	0	9						
10	22	62	12	5	-	-	-	-	-	-	6	5	11	5	17	7						
10	29	62	11	21	-	-	-	-	-	-	3	6	16	6	19	8						
11	26	62	12	12*	0	0	0	0	0	0	3	6	8	5	11	8						
12	17	62	1	23*	0	0	0	0	0	0	4	6	13	6	17	8						
1	28	63	2	20*	1	1	0	0	1	1	15	7	20	6	35	9						
2	25	63	3	24*	0	1	0	1	0	1	32	7	26	6	58	9						
3	26	63	4	17*	0	1	0	1	0	1	18	7	12	6	30	9						
4	30	63	5	22*	1	1	0	0	1	1	30	7	24	6	54	9						
5	27	63	6	19*	0	1	0	1	0	1	31	7	19	5	50	9						
6	24	63	7	23*	0	0	0	1	0	1	34	5	24	5	58	7						
7	25	63	9	9*	1	1	0	0	1	1	16	3	12	3	28	4						
8	19	63	10	10*	0	1	0	1	0	1	3	5	14	6	17	8						
9	30	63	10	29*	0	0	0	0	0	0	12	6	15	6	28	5						

PLANKTON POPULATION

STATE SOUTH CAROLINA
MAJOR BASIN SOUTHEAST
MINOR BASIN SAVANNAH RIVER
STATION LOCATION SAVANNAH RIVER AT
NORTH AUGUSTA, SOUTH CAROLINA 048

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				ROTIFERS												CRUSTACEA										
															GENERA AND COUNT LEVEL (See text for Codes)												GENERA AND COUNT LEVEL (See text for Codes)									
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT		PROTOZOA (Identification) Number per ml.	NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD		NEMATODES (Identification) Number per liter	OTHER ANIMAL FORMS (Number per liter)
															GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	64	37	56	26	57	9	2	8	20	1	1	23	11	2									0						0	0
10	15	62	65	37	56	29	57	7	2	5	22	0	0	0											0						0	0
11	5	62	56	37	64	23	57	10	2	8	22	0	0	3											0						0	0
11	20	62	56	54	64	20	28	7	33	3	16	20	0	0											0						0	0
12	3	62	56	64	57	11	64	9	28	4	12		0	2											0						0	0
12	17	62	56	61	64	11	57	9	58	2	17	60	0	2											0						0	0
1	22	63	92	19	56	12	32	8	62	3	58			0											0						0	0
2	5	63	57	26	56	17	64	4	28	4	49			0											0						0	0
2	18	63	57	37	56	23	82	7	2	4	29			0											0						0	0
3	4	63	56	52	57	23	92	3	82	2	20			0											0						0	0
3	19	63	56	33	57	29	82	7	64	5	26			0											1						0	0
4	1	63	57	48	56	21	58	5	62	3	23			35	11	1	17	1	21	1	15	1			0						0	0
4	15	63	57	33	56	12	2	9	65	5	41			1											0						0	0
5	7	63	57	34	56	12	28	9	70	5	40			-											-						-	-
5	20	63	58	51	57	19	32	4	64	4	22			-											-						-	-
6	3	63	57	27	56	22	58	17	26	7	27			-											-						-	-
6	18	63	56	25	57	12	2	6	51	6	51			-											-						-	-
7	8	63	56	25	57	13	58	9	65	9	44			-											-						-	-
7	15	63												-											-						-	-
8	5	63	56	12	57	12	16	7	92	4	65			-											-						-	-
8	19	63	57	14	2	13	56	12	16	4	57			-											-						-	-
9	3	63	56	15	57	14	2	14	55	9	48			-											-						-	-
9	16	63	56	19	2	16	82	10	58	6	49			-											-						-	-

PLANKTON POPULATION

STATE SOUTH CAROLINA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT NORTH AUGUSTA, SOUTH CAROLINA 48

DATE OF SAMPLE			ALGAE (Number per milliliter)										MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS		INERT DIATOM SHELLS		1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	300	0	0	80	0	20	0	130	80	0	130																			
10	15	62	100	0	0	20	0	0	0	30	40	20	10																			
11	5	62	200	0	0	40	0	0	0	80	120	0	0																			
11	20	62	200	0	20	0	0	0	0	50	170	0	0																			
12	3	62	500	60	0	40	0	0	0	100	310	0	0	87	1																	
12	17	62	400	0	40	0	0	40	20	40	290	40	40	87	1																	
1	22	63	300	0	20	0	0	20	0	70	220	130	420																			
2	5	63	100	0	40	0	0	30	0	10	30	10	60																			
2	18	63	400	0	0	40	0	0	150	110	40	70	20																			
3	4	63	300	0	0	20	0	0	70	220	20	150	70																			
3	19	63	400	0	0	20	0	20	20	260	20	40	70	69	1																	
4	1	63	400	20	0	20	0	130	0	110	110	20	70																			
4	15	63	100	0	0	0	0	0	0	60	0	20	20																			
5	7	63	00	0	0	0	0	0	0	20	20	0	0																			
5	20	63	200	0	20	0	0	0	0	110	90	90	40																			
6	3	63	00	0	0	0	0	0	0	0	0	0	0																			
6	18	63	00	0	0	0	0	0	0	0	0	0	0																			
7	8	63	5300	110	0	860	0	110	110	2970	1210	1540	260	69	4	68	3	24	1	38	1											
7	15	63	200	0	0	0	0	0	0	90	130	20	40																			
8	5	63	200	0	0	150	0	20	0	40	20	20	0																			
8	19	63	200	0	0	40	0	20	0	20	150	50	20																			
9	3	63	100	20	0	0	0	70	0	0	20	0	0																			
9	16	63	600	0	20	70	0	110	0	110	320	70	70																			

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE SOUTH CAROLINA

MAJOR BASIN SOUTHEAST

MINOR BASIN SAVANNAH RIVER

STATION LOCATION SAVANNAH RIVER AT NORTH AUGUSTA, SOUTH CAROLINA 48

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	15	3831	236	89	147	5	26	18	2	2	14	0	8	7	1	24
11	5	62	11	19	6182	190	66	124	1	22	18	1	1	15	1	6	7	1	11
12	9	62	12	16	1472	339	62	277	2	20	19	1	2	16	0	6	3	1	11
1	11	63	1	23	1726	69	24	45	1	8	4	0	1	3	0	2	3	1	5
2	5	63	2	25	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	4	63	3	18	2201	524	252	272	10	81	40	2	3	30	5	18	28	3	72
4	9	63	4	15	917	430	168	262	7	54	39	10	6	23	0	15	14	3	36
5	6	63	5	20	2997	336	145	191	7	44	23	1	1	20	1	13	20	2	36
8	24	63	9	3	11371*	85	42	43	0	13	9	0	1	8	0	5	5	1	9
9	23	63	10	6	5136#	158	62	96	3	21	13	1	1	11	0	6	6	1	12

* FLOW UNKNOWN
* HIGH FLOW
# ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE SOUTH CAROLINA
MAJOR BASIN SOUTHEAST
MINOR BASIN SAVANNAH RIVER
STATION LOCATION SAVANNAH RIVER AT
NORTH AUGUSTA, SOUTH CAROLINA 48

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	9	62	21.1	-	7.0	-	-	-	-	-	7	17	14	-	5	-	-	-	-
10	15	62	21.9	-	7.1	-	-	-	-	-	4	17	14	-	5	-	-	-	-
10	22	62	20.2	-	7.3	-	-	-	-	-	-	16	14	-	5	-	-	-	-
10	29	62	15.9	-	7.0	-	-	-	-	-	7	19	14	-	7	-	-	-	-
11	6	62	14.5	-	7.4	-	-	-	-	-	4	19	14	-	5	-	-	-	-
11	14	62	15.0	-	7.0	-	-	-	-	-	8	16	14	-	5	-	-	-	1000
11	20	62	14.9	-	6.9	-	-	-	-	-	8	17	16	-	8	-	-	-	-
11	26	62	13.6	-	7.2	-	-	-	-	-	8	17	16	-	8	-	-	-	-
12	3	62	14.2	-	7.2	-	-	-	-	-	8	18	14	-	5	-	-	-	-
12	10	62	9.1	-	7.0	-	-	-	-	-	4	18	16	-	10	-	-	-	100
12	17	62	9.7	-	6.9	-	-	-	-	-	5	18	14	-	8	-	-	-	*100
1	1	63	8.4	-	6.9	-	-	-	-	-	6	19	16	-	10	-	-	-	-
1	7	63	9.9	-	7.0	-	-	-	-	-	-	18	14	-	10	-	-	-	-
1	14	63	9.4	-	7.1	-	-	-	-	-	-	18	12	-	10	-	-	-	*100
1	28	63	7.2	-	7.3	-	-	-	-	-	5	15	16	-	50	-	-	-	-
2	5	63	8.5	-	7.0	-	-	-	-	-	-	17	12	-	20	-	-	-	-
2	18	63	8.8	12.1	7.0	-	-	-	-	-	3	14	10	-	30	-	-	-	58000
2	25	63	10.0	12.2	7.0	-	-	-	-	-	3	15	12	-	15	-	-	-	100
3	4	63	9.3	12.1	6.9	-	-	-	-	-	7	15	12	-	25	-	-	-	-
3	11	63	10.5	-	6.7	-	-	-	-	-	-	14	12	-	35	-	-	-	-
3	19	63	11.8	-	6.7	-	-	-	-	-	-	15	14	-	25	-	-	-	500
3	26	63	12.0	12.2	7.0	-	-	-	-	-	-	17	14	-	25	-	-	-	-
4	1	63	15.7	-	7.3	-	-	-	-	-	-	20	20	-	25	-	-	-	13000
4	8	63	15.9	10.3	7.4	-	-	-	-	-	-	16	14	-	25	-	-	-	100
4	15	63	13.8	10.9	7.1	-	-	-	-	-	-	15	12	-	25	-	-	-	400
4	22	63	12.0	-	7.1	-	-	-	-	-	2	14	12	-	40	-	-	-	2100
4	30	63	14.8	9.9	7.0	-	-	-	-	-	3	15	18	-	35	-	-	-	*100
5	7	63	15.8	10.2	7.0	-	-	-	-	-	3	16	12	-	30	-	-	-	*100
5	20	63	19.5	9.5	7.1	-	-	-	-	-	3	15	12	-	30	-	-	-	-
5	27	63	12.1	9.8	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	4800
5	28	63	-	-	-	-	-	-	-	-	3	14	10	-	35	-	-	-	*100
5	3	63	17.4	-	7.0	-	-	-	-	-	2	15	14	-	25	-	-	-	-
6	12	63	19.9	-	7.1	-	-	-	-	-	2	15	12	-	30	-	•2	-	3300
6	18	63	19.2	9.2	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	1900
6	24	63	20.1	8.4	6.8	-	-	-	-	-	2	16	14	-	25	-	-	-	-
7	15	63	21.5	9.1	7.3	-	-	-	-	-	3	16	14	-	20	-	-	-	-
7	29	63	24.5	-	7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	900
8	12	63	24.1	-	7.2	-	-	-	-	-	5	20	18	0	*25	4	•0	50	-
9	3	63	20.9	9.3	7.1	-	-	-	-	-									

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE SOUTH CAROLINA
MAJOR BASIN SOUTHEAST
MINOR BASIN SAVANNAH RIVER
STATION LOCATION SAVANNAH RIVER AT NORTH AUGUSTA, SOUTH CAROLINA 48

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
9	10	63	20.3	8.3	7.0	-	-	-	-	-	3	18	18	5	*25	2	.0	45	1000
9	16	63	20.0	8.6	7.3	-	-	-	-	-	5	22	16	5	*25	4	.0	43	-
9	23	63	20.1	9.4	7.5	-	-	-	-	-	11	20	20	0	*25	6	.0	56	2000
9	30	63	19.9	-	7.2	-	-	-	-	-	6	24	20	40	*25	4	.0	65	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Augusta, Georgia
Operated by U.S. Geological Survey

STATE South Carolina

MAJOR BASIN Southeast

MINOR BASIN Savannah River

STATION LOCATION Savannah River at
North Augusta, South Carolina

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	6.010	5.900	6.120	5.680	15.100	9.510	8.670	19.300	12.000	16.300	11.800	6.450
2	6.010	6.340	5.790	5.570	13.300	6.890	12.800	20.600	7.680	17.900	11.000	6.560
3	5.900	6.010	5.790	6.230	9.150	6.670	13.300	23.400	9.870	18.500	8.910	6.890
4	6.890	5.570	5.790	6.560	10.600	6.890	13.500	21.600	11.200	17.800	7.440	8.210
5	6.340	5.790	5.900	6.120	12.300	9.870	13.000	20.600	10.800	18.000	6.010	8.100
6	6.450	5.790	6.340	5.460	11.600	11.300	12.000	20.100	11.400	18.200	9.030	7.990
7	6.120	5.570	6.120	5.570	10.800	14.400	8.910	20.900	11.400	16.600	11.200	7.440
8	6.010	5.680	6.120	5.460	8.320	17.600	7.550	21.700	8.860	15.900	8.790	6.670
9	5.900	6.670	5.570	5.350	6.890	15.700	7.330	22.000	6.340	17.300	9.510	6.890
10	6.010	6.340	5.570	5.680	7.000	10.300	6.120	22.000	6.230	18.000	6.780	8.210
11	6.560	5.790	5.570	6.780	6.450	8.790	7.000	20.600	6.230	18.200	6.010	9.150
12	6.450	5.570	5.570	6.450	10.800	16.300	6.560	16.500	6.120	17.900	5.680	8.430
13	6.010	5.350	6.120	5.570	11.700	18.800	5.790	14.000	6.010	14.900	6.010	8.910
14	5.680	5.350	6.450	5.350	10.600	21.400	6.450	15.500	6.670	7.330	7.550	7.110
15	5.570	5.790	5.680	5.350	7.990	20.400	5.570	15.700	6.340	6.230	8.210	6.670
16	5.680	6.450	5.460	5.350	7.110	24.900	5.680	15.700	5.790	6.120	8.320	6.890
17	6.120	5.900	5.900	5.790	6.560	22.000	6.890	15.500	6.560	6.120	6.670	7.990
18	6.010	5.130	5.680	6.780	6.560	19.500	6.780	13.400	6.780	6.120	6.120	7.990
19	5.900	5.460	5.570	8.550	9.150	21.100	7.330	7.230	8.790	6.450	6.010	8.670
20	5.900	5.570	5.900	9.750	15.400	27.300	6.230	8.260	8.790	6.450	8.140	8.210
21	5.460	5.570	5.790	15.700	14.300	29.700	5.680	11.000	7.770	6.010	9.750	7.110
22	5.680	6.780	6.010	17.800	9.990	30.300	5.570	11.000	10.100	5.900	9.390	6.560
23	5.790	6.340	5.680	13.900	6.670	30.600	5.460	10.800	8.910	5.790	8.910	6.450
24	5.680	6.010	5.570	16.800	6.670	26.400	5.570	10.500	11.000	6.010	6.890	6.450
25	5.790	5.900	5.680	17.400	7.880	23.700	6.010	7.000	14.800	6.560	6.890	6.560
26	6.340	5.350	5.790	15.300	11.600	23.700	6.450	5.790	19.000	6.780	6.890	6.560
27	5.790	5.460	6.230	9.510	11.300	23.100	6.010	5.790	19.000	6.230	7.000	6.560
28	5.570	5.570	6.450	9.510	11.000	23.100	5.570	6.340	19.400	5.460	6.450	6.560
29	5.790	5.900	5.900	15.500		22.800	5.570	10.700	20.100	6.230	7.220	8.210
30	5.680	6.670	5.900	15.000		19.700	10.900	13.700	18.800	10.800	8.430	10.200
31	5.680		5.790	14.700		9.390		15.100		11.800	7.110	

TOMBIGBEE RIVER BELOW COLUMBUS, MISSISSIPPI

This station is located approximately 11 miles south of Columbus Mississippi and a few miles above the Mississippi-Alabama State line. Samples are collected from the bank at Camp Pratt, YMCA.

The river receives the effluent from the city of Columbus Mississippi. Raw sewage from 16,400 people is discharged without treatment into the Tombigbee and the wastes from 3,600 receive treatment by lagooning. An estimated total BOD population equivalent of 17,000 is contributed by this community.

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Station Location: Tombigbee River below Columbus, Mississippi

Major Basin: Southeast

Minor Basin: Upper Tombigbee River

Station at: 33°18' Latitude 88°19' Longitude

Miles above mouth: 368

Activation Date: September 1961

Sampled by: Lowndes County Health Department

Field Analysis by: Lowndes County Health Department
U.S. Public Health Service

Other Cooperating Agencies: Mississippi State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: See remarks

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 5,400 square miles (estimated)

Period of record: Tombigbee River - 1899-1912; 1928 to present
Luxapalila Creek - 1943-47; 1949 to present

Average discharge in record period: 7,700 cfs. (estimated)

Maximum discharge in record period: –

Minimum discharge in record period: –

Remarks: Flow at surveillance station computed as sum of Tombigbee River at Columbus, Mississippi plus 3 times Luxapalila Creek at Steens, Mississippi.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.15	.05
	Na	4.0	3.5
	K	1.7	1.0
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	471	150
	Cd	*1	*2
	As	*7	*10
	B	11	25
	P	49	*3
	Fe	260	70
	Mo	*1	*2
	Mn	.4	2.5
	Al	–	53
	Be	*.02	*.02
	Cu	7	8
	Ag	*.1	*.2
	Ni	*1	*1
	Co	*1	*1
	Pb	*3	*2
	Cr	*1	1
	V	*1	*3
	Ba	65	30
	Sr	44	33

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.6	.2	April to June	–	–
January to March	–	–	July to September	3.6	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
6/17 - 6/24/63	DDT	0.006
8/12 - 8/19/63	Dieldrin	0.001
8/12 - 8/19/63	DDT	0.009
8/12 - 8/19/63	DDD	0.001

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MISSISSIPPI

MAJOR BASIN SOUTHEAST

MINOR BASIN UPPER TOMBIGBEE RIVER

STATION LOCATION TOMBIGBEE RIVER BELOW COLUMBUS, MISSISSIPPI

95

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												DATE OF DETERMINATION		RADIOACTIVITY IN PLANKTON			
					ALPHA						BETA								GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	8	62	12	5	0	1	0	1	0	1	19	6	10	5	29	7						
10	16	62	11	14	0	1	0	0	0	1	15	11	7	5	22	12						
10	22	62	11	16	0	0	0	0	0	0	6	6	6	5	12	8						
10	29	62	12	27	-	-	-	-	-	-	4	6	4	6	8	9						
10	31	62	12	13	-	-	-	-	-	-	9	7	6	8	15	11						
11	12	62	12	18	0	0	0	0	0	0	4	6	6	6	10	8						
11	19	62	12	21	0	0	0	1	0	1	22	6	31	6	53	8						
11	26	62	12	18	0	0	1	1	1	1	9	6	10	6	19	8						
1	23	63	1	24*	0	1	0	1	0	1	13	6	10	6	23	8						
1	20	63	2	26*	0	0	0	1	0	1	34	7	21	7	55	10						
3	26	63	4	17*	2	1	1	1	3	1	83	10	35	7	118	12						
4	29	63	5	31*	0	1	0	1	0	1	15	4	20	5	35	6						
5	27	63	6	24*	1	2	1	1	2	2	69	8	24	3	93	9						
6	24	63	7	31*	2	1	0	0	2	1	70	9	26	6	96	11						
7	29	63	8	21*	1	1	0	0	1	1	80	14	39	7	119	16						
8	26	63	10	8*	0	1	0	1	0	1	6	6	16	8	22	10						
9	30	63	11	6*	1	1	1	2	2	2	14	6	34	9	48	11						

PLANKTON POPULATION

STATE MISSISSIPPI
MAJOR BASIN SOUTHEAST
MINOR BASIN UPPER TOMBIGBEE RIVER
STATION LOCATION TOMBIGBEE RIVER BELOW COLUMBUS, MISSISSIPPI 095

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																									
			1ST		2ND		3RD		4TH				PROTOZOA (Identified only) Number per ml.	ROTIFERS												CRUSTACEA										NEMATODES (Identified only) Number per liter	OTHER AERIAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)											
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
10	8	62	26	71	57	3	70	3	82	3	20			2											0									0	0
10	22	62	26	56	57	6	16	6	53	3	29			0											0									0	0
11	12	62	26	49	92	5	68	5	65	4	37			0											0									0	0
11	20	62	26	33	62	9	53	6	10	4	48			0											0									0	0
12	10	62	62	40	26	15	43	9	92	8	28			0											0									0	0
12	24	62	62	50	92	9	26	7	82	4	30			1											0									0	0
1	7	63	26	14	62	12	2	9	92	5	60			0											0									0	0
1	28	63	26	12	64	10	65	7	70	7	64			0											0									0	0
2	11	63	62	12	92	12	26	12	64	11	53			0											0									0	0
2	25	63	92	31	74	8	62	8	32	7	46			0											0									0	0
3	11	63												54	11	2	21	2	17	1					6	76	2							3	0
3	26	63	82	17	92	14	62	10	74	6	53			3											0									0	0
4	9	63	92	53	26	18	91	5	57	3	21			4											1									0	0
4	22	63	82	52	26	10	62	8	71	6	24			-											-									-	-
5	13	63												-											-									-	-
5	27	63	92	21	62	8	74	8	71	7	56			-											-									-	-
6	10	63	26	18	92	17	62	12	74	8	45			-											-									-	-
6	24	63												-											-									-	-
7	22	63												-											-									-	-
8	12	63												-											-									-	-
8	26	63												-											-									-	-
9	9	63												-											-									-	-
9	16	63												-											-									-	-

PLANKTON POPULATION

STATE MISSISSIPPI
MAJOR BASIN SOUTHEAST
MINOR BASIN UPPER TOMBIGBEE RIVER
STATION LOCATION TOMBIGBEE RIVER BELOW COLUMBUS, MISSISSIPPI

95

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genus and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	8	62	400	0	0	70	0	140	40	80	60	280	20																				
10	22	62	1900	0	0	170	0	440	0	660	620	120	120	68	3	51	2	25	1	87	1												
11	12	62	200	0	0	20	0	20	0	30	110	50	0																				
11	20	62	200	0	0	60	0	60	0	30	50	60	90																				
12	10	62	100	0	0	30	0	60	0	20	30	20	20																				
12	24	62	800	0	20	130	0	70	0	130	420	70	150	92	1	88	1																
1	7	63	100	0	0	0	0	20	0	20	20	50	0																				
1	28	63	400	0	0	80	0	100	70	10	130	10	130																				
2	11	63	800	20	0	270	0	80	60	20	340	20	110																				
2	25	63	300	0	0	70	0	0	110	0	90	0	220																				
3	11	63	100	0	20	0	0	0	20	0	70	40	150																				
3	26	63	2500	0	40	200	0	770	1300	20	150	0	20	60	3	52	2	65	1	51	1	57	1										
4	8	63	1600	0	0	700	0	310	0	70	480	20	70	38	2	92	2	65	1														
4	22	63	1900	0	40	900	0	310	20	400	220	70	40	38	2	24	1	65	1	26	1	68	1	71	1								
5	13	63	200	0	0	60	0	60	0	0	90	0	90																				
5	27	63	400	0	0	70	0	70	0	40	180	0	0																				
6	10	63	900	0	20	330	0	180	0	200	130	40	110	23	1	52	1																
6	24	63	200	0	0	20	0	0	0	70	130	0	0																				
7	22	63	100	0	0	20	0	0	0	20	40	20	0																				
8	12	63	800	20	20	420	0	60	40	60	210	20	0	38	1																		
8	26	63	7100	480	90	1540	0	880	70	3450	620	510	330	51	3	38	2	35	1	24	1	69	1										
9	9	63	700	0	20	200	0	40	0	240	220	390	170																				
9	16	63	6900	70	570	520	0	1430	20	3890	380	480	50	51	4	15	2	69	2	38	2												

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MISSISSIPPI

MAJOR BASIN SOUTHEAST

MINOR BASIN UPPER TOMBIGBEE RIVER

STATION LOCATION TOMBIGBEE RIVER BELOW COLUMBUS, MISSISSIPPI

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
11	5	62	11	12	4790#	125	49	76	1	11	16	1	1	14	0	5	6	1	9
12	20	62	12	31	4210	178	54	124	2	14	13	1	1	11	0	6	5	1	13
4	1	63	4	22	2300	210	84	126	4	23	21	3	3	13	2	10	8	1	17
5	20	63	5	29	1801#	89	29	60	-	-	-	-	-	-	-	-	-	-	-
6	17	63	6	24	3450	123	37	86	1	8	14	2	1	11	0	6	3	1	4
7	9	63	7	22	1125	383	156	227	4	53	32	3	5	22	2	24	17	2	24
8	12	63	8	19	4501	142	56	86	1	15	16	1	1	13	1	8	6	1	9
9	6	63	9	16	5675	148	67	81	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSISSIPPI
MAJOR BASIN SOUTHEAST
MINOR BASIN UPPER TOMBIGBEE RIVER
STATION LOCATION TOMBIGBEE RIVER BELOW COLUMBUS, MISSISSIPPI

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
8	12	63	-	-	-	-	-	-	-	-	9	46	58	0	*25	4	*0	84	-
8	19	63	-	-	-	-	-	-	-	-	10	44	40	0	*25	5	*0	76	-
8	26	63	-	-	-	-	-	-	-	-	6	42	44	0	*25	6	*0	67	-
9	9	63	-	-	-	-	-	-	-	-	6	32	36	10	*25	6	*0	62	-
9	16	63	-	-	-	-	-	-	-	-	5	32	20	10	*25	6	*0	64	-
9	23	63	-	-	-	-	-	-	-	-	7	38	36	0	*25	7	*0	85	-
9	30	63	-	-	-	-	-	-	-	-	8	40	38	5	*25	6	*0	80	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Computed Data for Columbus, Mississippi
Operated by U.S. Geological Survey

STATE Mississippi

MAJOR BASIN Southeast

MINOR BASIN Upper Tombigbee River

STATION LOCATION Tombigbee River below Columbus, Mississippi

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.845	.639	1.040	3.030	7.870	2.720	3.700	17.200	19.200	5.140	5.360	1.060
2	.920	.641	1.040	2.600	6.420	3.140	1.420	18.100	16.800	3.780	4.840	.980
3	1.040	.641	1.020	2.120	6.180	4.210	3.170	19.900	14.300	4.450	3.350	.951
4	1.100	.639	.987	1.860	7.540	3.920	2.990	20.200	11.600	6.010	2.810	.838
5	1.100	.639	.983	1.700	6.370	4.170	2.820	16.800	7.820	5.110	2.530	1.940
6	.965	.643	1.010	1.610	5.110	12.400	2.910	11.600	4.280	3.720	2.180	3.530
7	.843	.643	1.060	1.540	4.360	16.600	4.190	10.100	2.980	2.730	1.710	2.460
8	.768	.639	1.110	1.490	3.850	16.200	5.630	8.310	2.440	2.700	1.560	1.650
9	.727	.637	1.120	1.450	3.430	16.700	4.970	6.780	2.100	6.280	1.450	1.180
10	.710	.643	1.110	1.420	3.100	16.600	4.310	5.850	1.880	4.880	1.320	.982
11	.687	.659	1.050	1.410	.580	13.900	3.820	4.690	1.700	2.720	1.240	.876
12	.696	.699	.992	1.500	3.140	13.800	3.450	3.390	1.500	2.120	1.220	.810
13	.686	.724	.941	1.960	4.070	21.300	3.080	2.920	1.390	1.690	1.220	.797
14	.665	.822	.878	2.010	3.670	24.200	2.760	2.880	1.280	10.000	1.500	.856
15	.651	.884	.865	1.880	3.290	25.000	2.380	2.680	1.210	23.600	1.430	.898
16	.629	.919	.899	1.780	2.940	29.200	2.180	2.460	1.150	27.600	1.360	.788
17	.616	.946	.985	1.700	2.720	32.600	2.080	2.270	1.210	34.300	1.320	.164
18	.616	1.060	1.030	1.660	2.470	32.500	1.970	2.170	2.180	37.400	1.140	.741
19	.619	1.430	1.060	1.880	3.300	29.300	1.890	1.970	2.560	35.000	1.010	.721
20	.623	1.880	1.080	2.950	7.230	24.200	1.790	1.770	3.250	28.500	.921	.696
21	.608	1.960	1.090	3.860	7.380	18.600	1.730	1.620	5.980	24.200	1.040	.667
22	.602	1.980	1.130	3.410	5.730	13.500	1.690	1.460	8.940	19.100	1.270	.631
23	.595	1.840	1.420	2.930	4.430	8.920	1.640	1.340	10.600	15.900	1.370	.606
24	.639	1.630	1.770	2.860	3.810	5.770	1.600	1.270	9.720	11.500	1.340	.571
25	.671	1.490	1.960	3.090	3.630	4.870	1.600	1.250	11.000	6.450	1.110	.547
26	.665	1.310	1.980	2.950	3.450	6.540	2.140	3.670	10.900	5.560	.975	.530
27	.647	1.190	2.220	2.930	3.190	8.010	3.230	12.600	11.000	6.260	.897	.530
28	.629	1.120	2.170	3.080	2.880	6.640	3.090	20.200	10.100	5.380	.880	.528
29	.620	1.080	2.340	3.080		5.720	7.150	17.700	8.710	4.880	.883	.546
30	.624	1.040	3.020	3.560		4.500	15.800	21.900	7.570	4.380	.988	.578
31	.632		3.380	7.320		4.020		21.900		3.850	1.140	

Computed as sum of Tombigbee River at Columbus, Mississippi plus the flow from the Luxapilila Creek at Camp Pratt.

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